

MOTOR AGE

Vol. XXVIII
No. 14

CHICAGO, SEPTEMBER 30, 1915

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Seven
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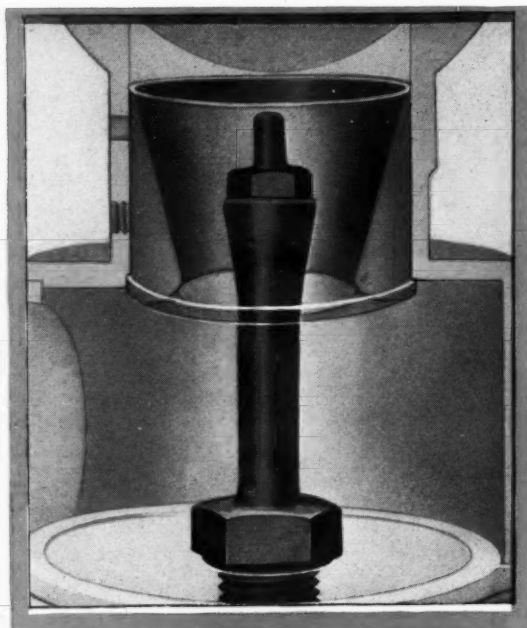


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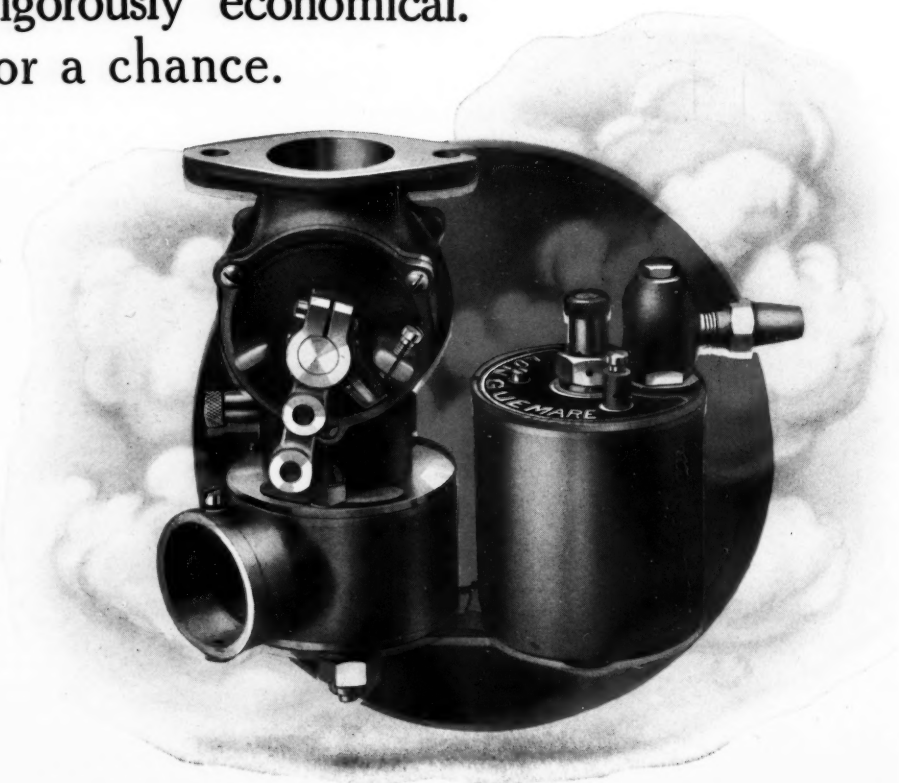
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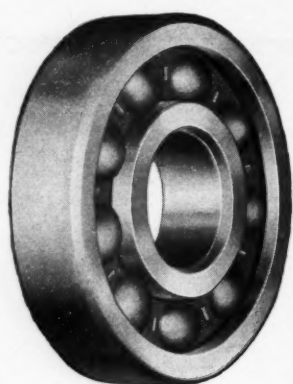
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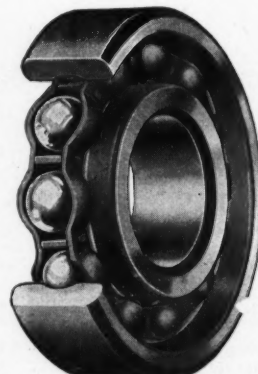
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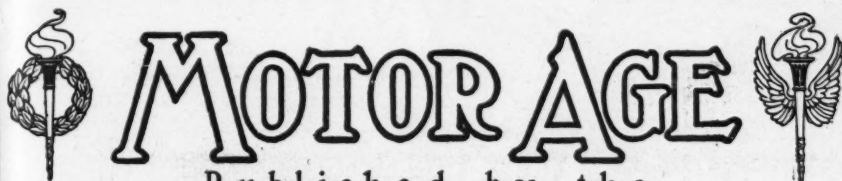
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Partial Sectional View
New Departure Single Row



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NEXT WEEK

The feature of Motor Age for the issue of October 7 will be a pen and word picture of the Sheepshead Bay derby for the Vincent Astor cup, a race that probably draws the curtain of board oval courses for this year.

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—C. C. Casey in Printers' Ink.

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MOTOR AGE



The Loyal Legion of Speed

*Being the Short and Simple Annals of the Mechanician,
an Unsung and Unhonored Hero*

By E.V. Rickenbacher and J.C. Burton

HE is the Damon of the gasoline circuit, a Damon to the race driver's Pythias. He exudes loyalty with sweat and places his life in the hands of the man with whom he rides. He is a faithful toiler, a glutton for punishment. Before a race, he often works night and day on his car, oiling parts, tightening nuts and bolts, taping and shellacing connections.

When the motors sing their song of hate and the exhausts bark their defiance, he pits his eyes and ears against lurking disaster. He is the sentinel that challenges the approach of danger and defeat. More depends on him than is commonly imagined.

After the checkered flag of victory drops, he drags himself wearily to his garage. His legs are weak, his hands are cut, his back is bruised and swollen.

Yet he seldom sees his name in the newspapers. The Homers, who pound out the Iliads of speed on typewriters, generally ignore him. Few pay him homage while he lives and should he be killed, morbid

editors turn rules around his picture and let it go at that. There is little room on the pink sheet for a dead one.

He is an unsung, unhonored hero. He is only a mechanician.

Like the third string catcher of the baseball team, who warms up the Johnsons and Alexanders in the bull pen from April to October; like the bruised and battered tackle on the scrub eleven who stands up before the catapultic line plunges of the varsity backs in daily practice, the mechanician rarely drinks from the flagon of fame. He is a valet to a racing car and a willing servitor of a celebrated driver. That is enough.

Loyal to Car and Driver

His grin is broadest and his eyes sparkle most when his car and driver win. His love for the thoroughbred of steel in which he rides is like the affection of the exercise boy or jockey for his horse. He believes that his car is the fastest of them all and that his driver is the greatest of the great, although the season's records

may not bear him out in such a prejudiced opinion.

*I have strung my bloomin' lyre
In a sort of mad desire*

*To give the mechanician what's his due,
For I cannot help but feel
'Side the man who's at the wheel*

Another hero put the triumph through.

This is the motive that prompts the writing of this article. The mechanician deserves honorable mention at least for his loyalty and an Iron Cross for his matchless daring. Turn back the pages of Mercury's note book and you will find there stories of mechanician's achievements that should warm the red corpuscles in your blood.

It was in the Crown Point meet of 1909, the first road race ever held in the middle west, that Gil Anderson, now the veteran driver of the Stutz team, but then a mechanician for Adolph Munson on the Marmon, proved his courage. For 50 miles, he lay across the hood of the Marmon and as the car devoured distance on the straight-

aways and swept around the tortuous turns, made delicate adjustments on a faulty carbureter.

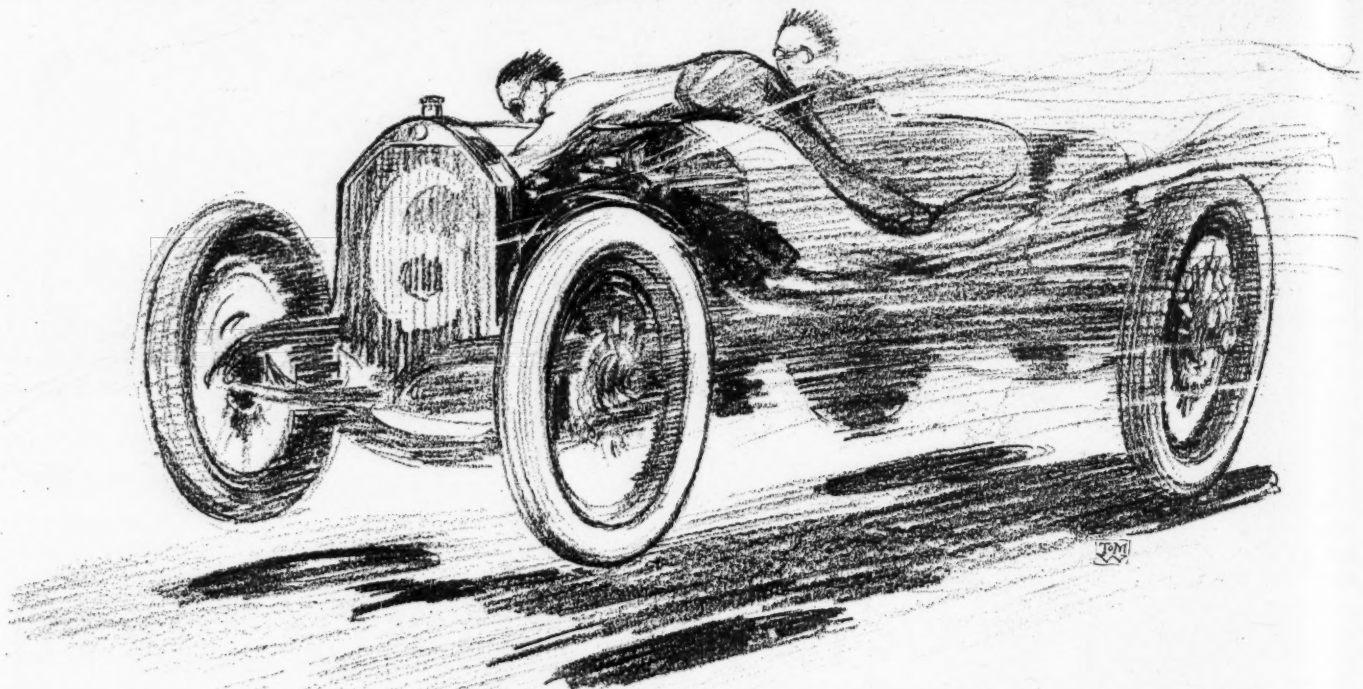
The Indianapolis classic of 1913 developed two oil-pumping heroes who for a fleeting moment, rose from the drab obscurity of the mechanic's seat. The fortitude of Paul Martin, who rode beside Charley Merz in the Stutz, was put to the acid test when the car caught on fire on the last lap of the race. Straddling the bonnet of the veritable chariot of fire, Martin beat out the flames with his bare

suffered a lashing on the arm that made him writhe with pain. Just as Rickenbacher had about decided to quit rather than take the chances of having his arm broken, he felt O'Donnell's arm encircling his shoulders and the torture suddenly ceased. After the Duesenberg had flashed over the line, O'Donnell had to be lifted from the car and his arm was so badly cut and bruised that he could not use it for a week. He proved his loyalty and courage, however.

Earl Devore, selected by Finley Porter

mechanician who runs to the pit for gasoline or fights fire with his bare hands that his car and driver may survive the grueling contest.

And so we are moved to write the short and simple annals of the poorly paid and the little honored, the annals of the loyal legion of the gasoline circuit. It is a legion recruited from several sources. Taxi drivers and professional chauffeurs, farm hands and college students, tire salesmen and a hotel clerk are represented in the troop, some of whose members were born



For 50 miles Anderson lay across the hood of the Marmon and made delicate adjustments on a faulty carbureter

hands and finished the contest with less eye lashes and hair than he had when he started and with burns showing red on his grease-covered face.

Paul Stevens a Modern Spartan

In the international sweepstakes of that year, Paul Stevens made his debut as a mechanic. He was Ralph Mulford's helper, a rank tyro but game. With more than half the distance covered and third place practically clinched, Mulford ran out of gasoline on the back stretch. Leaping from the exhausted Mercedes, Stevens started for the pits, more than a mile away. He did not lope, he sprinted. Although a neophyte, he knew that seconds were very precious in a struggle in which \$50,000 is at stake. Darting through the crowds of the infield, stumbling and falling in the high grass, jumping fences and pools of sluggish water, he raced to the pits, staggered over the pit rail so that the car would not be disqualified, delivered his message to Garcia—"Ralph's out of gas,"—and fell in a faint.

Eddie O'Donnell served as Rickenbacher's mechanic last season. In one of the Galveston beach races, a tread on one of the rear tires worked loose and at every revolution of the wheel, the driver

as a member of the F. R. P. team, has red hair. Sorrel-thatched men are noted for their pluck. He rode with Hughie Hughes in the Ono in the 1915 grand prize. When 2 miles from the pits, the gasoline tank ran dry. The red-haired mechanic was out of his seat and far down the course before Hughes realized what had happened. The records show that only 25 minutes were lost because of the stop. This was Devore's remarkable time for 4 miles of desperate, heart-breaking running, the last 2 miles of which were made with added weight, for Earl had a 1-gallon can of fuel on his shoulder.

It is such men as these—Anderson, Martin, Stevens, O'Donnell and Devore—that dignify the obscure niche they occupy in Motoria's hall of fame. All mechanics are cast in the same mould, a mould that produces men of supreme courage and unflinching loyalty.

The outfielder who makes a one-handed catch that checks a ninth-inning rally; the crouching tackle or guard who stops the last desperate plunge of an opposing player on the 1-yard line in the final minute of play receives at least a sentence of credit for his feat in the account of the game, but nothing is said of the

with the proverbial silver spoon in their mouths while others tasted pewter with their bread and milk. They have a common uniform, a suit of khaki or duck, and a common ambition to move over into the seat behind the steering wheel and some day be served as they have served, to be worshipped as they have worshipped—by a mechanician.

Mercedes Fritz, Gypsy of Speed

Perhaps the best known mechanician in the country was Mercedes Fritz Walker, who met his death in the 100-mile race at Galesburg last fall. He was the dean of all oil-pumpers, one of the most eccentric characters identified with racing. Scion of an aristocratic German family, he was a classmate of the future kaiser, Crown Prince Friedrich Wilhelm, at the University of Bonn and served for more than 2 years in the German navy, participating in the Boxer rebellion and walking from Shanghai to Peking when his boat, the Hela, was shot to pieces and beached.

Mercedes Fritz, whose father was an engineer in the Mercedes factory, left the navy to ride with Jenatzy in the Gordon Bennett cup race of 1913, the Emperor William's trophy event and the Paris-Madrid race. The following year, he was

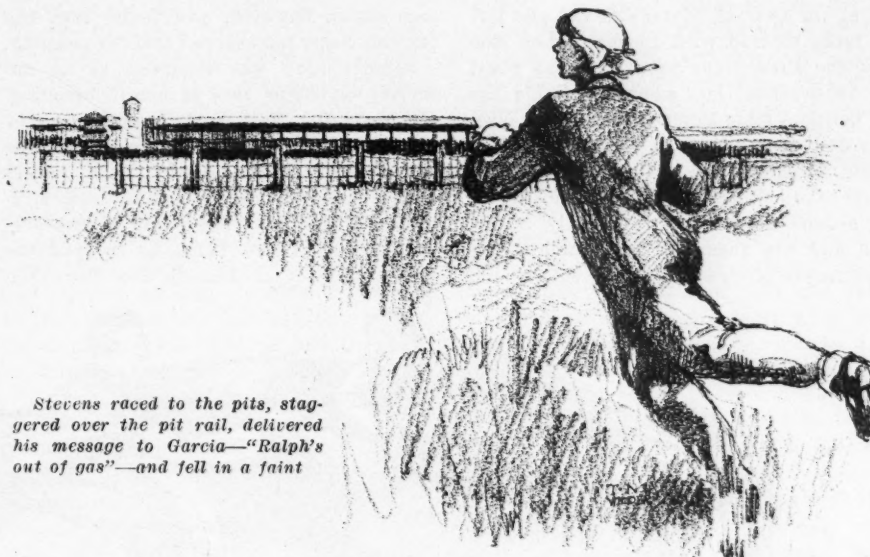
selected to escort Foxhall Keene's Mercedes across the Atlantic and pumped oil for the New York millionaire in the Vanderbilt cup races of 1904 and 1905.

A born mechanic and respected for his loyalty, the services of Mercedes Fritz were in great demand. He assisted in building Tracy's Locomobile for the 1906 Vanderbilt, rode with Victor Hemery in the 1908 grand prize and pumped oil for Barney Oldfield, Erwin Bergdoll, Ralph Mulford, Eddie Rickenbacher and Billy Knipper before a fatal accident cut short his gypsy career.

Goetz Expert on Sundaes

From mixing ice cream sodas in his father's drug store to riding with Ray Harroun in the yellow Marmon is the vocational switch made in 1909 by Harry Goetz, generally regarded as the master mechanic of them all and until the retirement of the Maxwell from racing in July, lord high valet of the black cars driven by Eddie Rickenbacher, Billy Maxwell and Tom Orr. He served his apprenticeship under an export tutor and learned his lessons well. As a consequence, he has few equals in diagnosing trouble in an emergency. He scents faults either before they develop or it is too late to remedy them. He is careful and conscientious, and perfects each part of his car as if victory depended on each separate unit. He is cool in every crisis, never losing his head. Combined with these virtues, he has the ideal build for a mechanic, being small and quick and weighing not more than 120 pounds.

Eddie O'Donnell, who served as a mechanic for three seasons before he was elevated to the rank of driver at San Francisco this spring, is the Maud Muller of the loyal legion, having raked the hay on his father's farm near Whitewater, Wis., before he left the cows and chickens and decided that working in the service department of the Mitchell company at Milwaukee "was the life." Mort Roberts



Stevens raced to the pits, staggered over the pit rail, delivered his message to Garcia—"Ralph's out of gas"—and fell in a faint

was O'Donnell's patron and a roll of adhesive tape his talisman, Eddie's foresight in having the tape in his pocket winning the Pabst trophy for the Duesenberg driver and binding the former farm hand to a permanent job as mechanic, for when Roberts had a commanding lead in the race, a gasoline line broke but O'Donnell repaired the connection in less time than it takes to tell about it.

Paul Frantzen, Medical Student

Paul Frantzen, who was hurled over the embankment of the Tacoma track with Billy Carlson and suffered fatal injuries, had a morbid wish satisfied. Like the western gun fighters of the California mining camps, he declared that he wanted to die with his boots on, that he wanted to go out while traveling at high speed in a racing car. The fates gratified that gruesome desire and snuffed out the life of one of the most promising mechanics in the game.

Cupid was indirectly responsible for Frantzen being a mechanic. His sister was a sweetheart of Billy Carlson's brother

and it was through the influence of his prospective relative by marriage that the speed-mad boy secured a position on the Maxwell team.

Had he lived, Frantzen some day would have been wealthy, for his father is a rich resident of San Diego, Cal. Frantzen was sent to a medical school but the higher education did not take. He was more interested in motor car chassis than human skeletons and showed greater skill at mending broken springs than fractured bones. He left the clinic to become a professional motorcycle rider and in a race from Los Angeles to Phoenix, plunged over a cliff and was lost in the desert for 18 hours. He was found by Mexicans in a half-crazed condition as a result of a scalp wound and thirst.

The police of Milwaukee forced Louis Fontaine, Ralph de Palma's mechanic, to take to the gasoline circuit for a livelihood. A chauffeur for Charles Pfeister, a wealthy resident of the city made famous by Schlitz and Sherby Becker, he was arrested so many times for speeding he decided to seek a realm where satisfying a desire for high velocity was not an offense punishable by fine.

Drove Vanderbilt Cup Lozier

Fontaine made his debut as a mechanic in the 1912 Vanderbilt cup race and rode with Nelson in the Lozier that Ralph Mulford piloted to victory in the same classic of the year previous. Nelson made such a poor showing that Fontaine was put at the wheel of the car in the grand prize 2 days later but he broke up before Bragg's Fiat got the checkered flag. Last year he brought the Lozier to Elgin and failing to annex any of the prize money, came to the conclusion that he was better fitted to pump oil than drive. He formed a partnership with de Palma this spring and rode with the Italian at Indianapolis, Des Moines, Elgin and Minneapolis.

Jack Gable, who sees that the motor of the Peugeot is getting enough gas and oil when Bob Burman runs wild, is an expert mechanic and a veteran in the loyal legion of speed. He was a machinist on the pay-

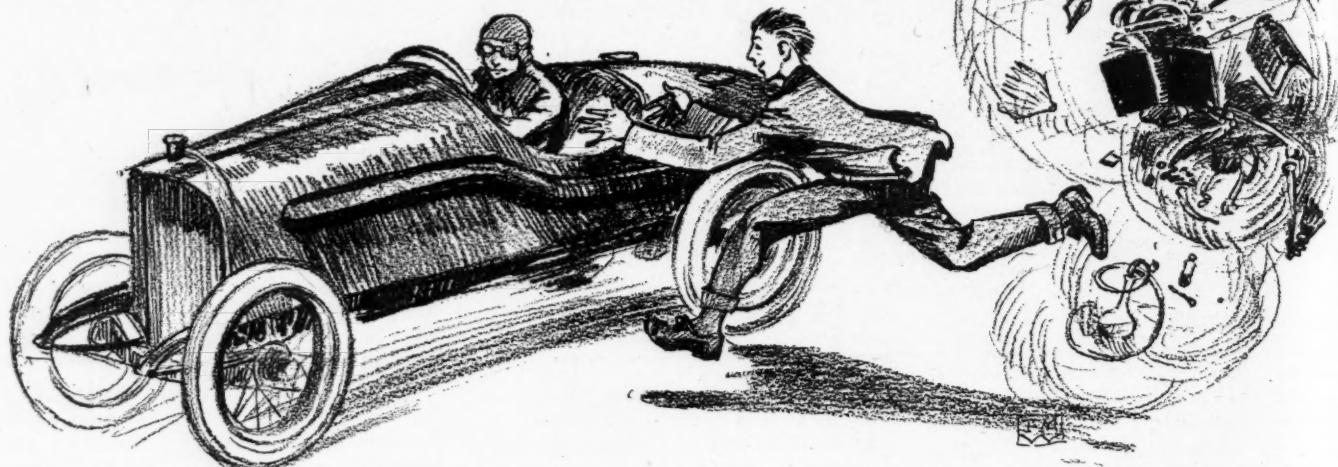


At Galveston, Eddie O'Donnell prevented Rickenbacher's arm from being fractured by protecting the driver from a lashing caused by a loose tread on the rear tire

roll of the Cutting Motor Car Co. and left his lathe to ride with Burman when Bob took the French car to the Cutting plant for an overhaul last summer. Gable has sat beside Victor Hemery and Felice Nazaro and at one time was associated with Erwin Bergdoll, the wealthy Philadelphia driver who had a corps of mechanics working around his garage continually in his time and has furnished many financially embarrassed oil-pumpers with meal tickets.

mon claim, however, and found that the taxicab meter best served him for panning.

Janette soon was regarded as an authority on motor cars of exotic breeding. He made the New York headquarters of the Benz company his club and often was called into consultation by Benz owners whose machines were suffering from mysterious ailments. When Ernie Moross purchased the Blitzen Benz, he secured the expert services of Janette and Tony can



Frantzen was more interested in motor car chassis than human skeletons and showed greater skill at mending broken springs than fractured bones

Fred McCarthy, who sits at the good left hand of Dario Resta when the Peugeot barks a challenge at time, is a man of several trades. His home is in Brooklyn and he formerly worked in the White shops when the cars that bear the albatross nameplate were manufactured in New York. On the removal of the White company to Cleveland, McCarthy purchased a taxicab and took orders from the traffic cops and tips from the sun dodgers that throng the Gay White Way. Nightly pilgrimages up and down Broadway soon grew monotonous, however, and McCarthy accepted a position with the Braender Tire Co., first acting as New York salesman and then being promoted to general road man. While traveling about the country and spreading the gospel of Braender tires at various race meets, he became acquainted with the drivers and when Ralph Mulford took over the Peugeot for a campaign last summer, he persuaded McCarthy to ride with him. Thus, McCarthy became connected with the Peugeot Auto Import Co., which backed Mulford and now is paying the cost of Dario Resta's triumphant invasion.

Tony Janette a Pioneer

Tony Janette is another mechanic who has honked at Broadway crowds from the seat of a taxicab. Tony bails from sunny Italy and came to this country with Louis Wagner for the 1906 Vanderbilt cup race. Louis returned to that dear France after failing to win the classic but Tony decided to remain in America. He had been told that the streets of New York were paved with gold but the first assay did not verify the promise of the prospectus. He determined to work the com-

boast of having groomed the famous car in which Barney Oldfield and Bob Burman rode to international fame and world's records for speed on the sands of Daytona-Ormond.

Billy Chandler Taxi Artiste

Billy Chandler, who rode in the Lozier with Mulford when Smiling Ralph took the Vanderbilt cup at Savannah in 1911, also received gratuities from the taxicab patrons of New York before he invested himself in the khaki of Mercurian knighthood. Billy's stand was at the corner of Forty-second street and Broadway, where George M. Cohan and Willie Collier are reputed to meet occasionally to exchange the gossip and pleasantries of the theatrical profession, and Chandler knew a large constellation of the dramatic stars well enough to call them by their first names.

Chandler drove a Lozier on his beat and became acquainted with Mulford through meeting him at the New York branch of the Lozier company. When Joe Horan was elevated to the rank of driver, Chandler asked Mulford for a job as mechanic and landed it.

Pete Henderson, who made his debut as a driver in the speedway race at Des Moines August 7, left the classic halls of Drake college to pump oil into the motor of a Mason. He is a Canadian by birth and in the off season, receives his mail at the postoffice at Fernie, B. C. He applied to Eddie Rickenbacher for a job when the Swiss driver was assisting Fred Duesenberg in building the Masons in 1913. Henderson's light weight was a recommendation and he had a personality that appealed to Baron Rick, but he was

not of age and Duesenberg refused to take him on unless he first secured his father's consent. Rickenbacher rendered first aid with pen, ink and paper, writing to Henderson pere who acceded to the request and made Rickenbacher his son's speed guardian. Henderson first rode with George Mason, the most obese driver that ever stepped on the throttle of a racing car, and then pumped oil for Eddie O'Donnell when the latter got a mount.

Jack Henderson, Pete's oldest brother, is a mechanic because he decided that his mother did not raise her boy to be a soldier. He was subject to military service in British Columbia but did not relish the idea of being a Tommy Atkins so ran away from home in February and joined the Duesenberg team in San Francisco. Tom Alley took a fancy to him and put him to work. At the present time, Jack is riding with Eddie O'Donnell. He showed his gameness in the 500-mile race at the Twin City speedway, holding a loose radius rod on the Duesenberg for the last century of the gruelling grind over the wavy concrete track. He was so exhausted at the completion of the contest that he fainted and had to be helped out of the car.

Stevens a Hotel Clerk

Paul Stevens, who satisfies his desire for high speed by riding with Ralph Mulford, yells "Front!" at lethargic bell boys when he is off duty and not serving as a mechanic. His father is proprietor of a hotel at Lake Placid in the heart of the Catskill mountains where for 2 or 3 weeks every summer, Mulford emulates Rip Van Winkle and flees from the nagging roar of

the racing car that he has taken to spouse. Stevens was behind the clerk's desk at the hotel when he first met the 1911 Vanderbilt cup winner. He confessed his heart's ambition to travel at 100 miles an hour, and Mulford gave him an opportunity to achieve it in the Indianapolis classic of 1913.

Fibs and Lands a Job

If Jack Van Hoven, who pumped oil for Rickenbacher at Omaha and Sioux City this year, had not been such a good liar, he probably would not have had the chance to develop into such a good mechanic. Early last spring he falsified himself into a job in the racing car department of the Maxwell company. He told Harry Goetz that there was nothing he didn't know about carbureters, magnetos, torque rods, cylinders and other parts of a machine. He talked so convincingly that Goetz believed him and took him on.

Van Hoven was guilty of some ludicrous blunders and when given the fourth degree, confessed that he had flirted with the truth in shameless fashion. As a punishment, he was put in the pits to take charge of the tire changes, the hardest and most thankless job on a racing team. The boy was game, however, and soon became a wizard in getting an old wheel off and a new wheel on a car.

After traveling with Ernie Moross' barnstorming troupe last season, Van Hoven went to Chicago and secured a position as chauffeur from P. D. Armour III, driving the grandson of the famous packer through Hawaii on a winter tour. This spring he went back on the Maxwell team and was promoted to relief mechanic.

Sioux City is Van Hoven's home. His mother, a widow, is quite wealthy and he himself owns considerable property. Unlike the majority of mechanics, he is not fastidious about his dress and about the last thing he will spend money for is clothes. When asked why he did not wear silk shirts, Panama hats, made-to-order suits and hand-sewed shoes, he replied:

"Why should I doll up? This racing suit makes the big hit with me."

Barney Oldfield's fides Achates, George Hill, is driving on the Pacific coast and Harold Dashbach now is inhaling the aroma of the veteran's cigars. Hill, who is a product of the Los Angeles' garages, worked for the company that sold Oldfield a Mercer and Barney took a fancy to him. Barney also took orders from him, for Hill proved to be a dictatorial person and bossed the boss in a way that was little short of lese majesty. Oldfield admired him for it, however, and ate out of his mechanic's hand without biting it off.

Before the Vanderbilt cup and grand prize road races were run at San Francisco, Dashbach was driving a tire service car. He helped to prepare Resta's Peugeot for the two classics and worked in the Peugeot pit. He went to New York with the Peugeot outfit and was to have ridden with Frank Galvin at Indianapolis but Galvin's car did not qualify and Dashbach watched the victory of de Palma from the pits. He first pumped oil for Oldfield at Tacoma.

Basso an Expert on Fiats

Domonic Basso, who traveled with the Maxwell team as Teddy Tetzlaff's helper, is one of the most picturesque members of the loyal legion. He is an Italian who came over to America with the 120-horsepower Fiats driven by Felice Nazzaro, Caleb Bragg and the late David Bruce-Brown in the 1911 grand prize. When E. E. Hewlett, the Los Angeles' sportsman, purchased one of the cars for Tetzlaff, Basso was included in the bill of sale. He rode to victory with Teddy in the world's record Santa Monica race, pumped oil into the motor of the Isotta at Indianapolis in 1913 and took care of the Blitzen Benz for Moross last season. He was thrown from Tetzlaff's Maxwell in practice for the 1914 dirt track event at Kalamazoo, sustaining a fractured skull, and has not ridden since.

Another mechanic of Italian birth is Roxy Pollatti, George Babcock's helper. He is a native of Turin and worked under

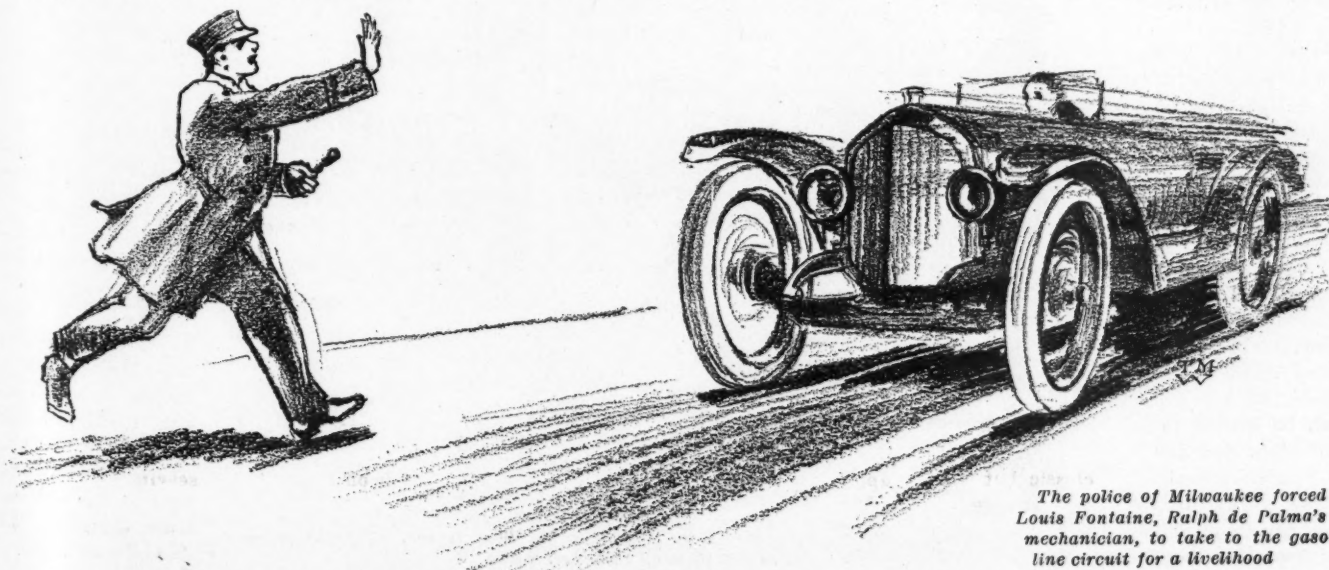
Babcock as a road tester for the Pope-Hartford company. When Harry Grant induced Babcock to take the wheel of the Sunbeam at Corona last year, the latter took faithful Roxy with him. Pollatti then joined the Maxwell team as relief mechanic but when Babcock got a Peugeot mount for Indianapolis, went back to his first boss.

Heine Ulbrecht's First Race

Before he became a driver, Heine Ulbrecht was known around the racing camps as an expert mechanic. He not only was in charge of Louis Disbrow's Zip and Jay-Eye-See but he served as valet to Bill Endicott's pig. Heine made his debut as a driver in a meet at Denver where there is a half-mile track within a mile track with one home stretch for both courses. He had the biggest allowance in a handicap event in which Disbrow passed all the cars but Ulbrecht's, and Heine won with yards to spare. At the conclusion of the race, he demanded of Alec Sloan, the team manager: "What did ya let all them touring cars on the track for?" He had been driving the half-mile course.

Many of the greatest drivers in the game have served their apprenticeship in the school of speed as mechanics. Eddie Rickenbacher rode with Lee Frayer in the 1906 Vanderbilt cup race. Ralph de Palma started his spectacular career as a humble helper of Al Campbell in practice for the 1907 Briarelliff trophy event. Campbell suffered a broken leg 2 days before the race and the Italian was substituted as pilot of the Allen-Kingston. Eddie Pullen, holder of the world's road racing record of 87.86 miles per hour, pumped oil for Hughie Hughes. Jean Chassagne, noted the world over for his conquest of time and distance on the Brooklands' track, is a former Sunbeam mechanic. Joe Horan and Billy Chandler saw service under Ralph Mulford.

During the racing season, the life of a mechanic is one overhaul after another. Before each contest he must put the car



The police of Milwaukee forced Louis Fontaine, Ralph de Palma's mechanic, to take to the gasoline circuit for a livelihood

in first-class shape. His driver relies on him to have the machine in the pink of condition—connections taped and shel-lacked, bolts and nuts cotter-pinned and all parts tight and well oiled.

While the race is in progress, the mechanic must be on the alert every second. He watches all four tires and keeps the driver posted on their condition. He pumps oil in the motor and air in the gas tank. He keeps his eye on overtaking cars. He receives the pit signals and relays them to the man with whom he rides. He assists the driver in taking on gas, oil and water and helps in making tire changes if more than one wheel is changed at a single stop. Should mechanical trouble develop, he must be able to diagnose the cause of the ailment immediately and make repairs, either with the assistance of the driver or single-handed.

Statistics for the past 10 years show that there have been three mechanics killed for every one driver. Thus, it can be seen that the mechanic's chances of injury are far greater than those of the man with whom he rides and on whose judgment and skill he must rely solely. It is usually the mechanic who is thrown first from a car and the man who is most seriously hurt in a spill. The driver has the steering wheel against which to brace himself in time of accident. The mechanic has nothing. He must gamble with injury and death. If the fates so decree, he lives; if not, he dies or is maimed.

In return for the long hours of labor he puts in and the chances he takes, the mechanic receives very small wages. His pay averages about \$30 per week and in addition he usually receives 10 per cent of the prize money won. Of course, the more expert and more experienced the mechanic, the better the pay and a system of gradual promotion rules in the ranks of the loyal legion of speed, for as the mechanic proves his worth, he is given a seat on a better car with a better driver.

Like the jockey, the mechanic should be light. The ideal weight is about 120 pounds. Although a pygmy, he must be strong and quick, a man of good habits and able to think fast in an emergency. Above all else, the mechanic must have supreme confidence in his driver and be willing to labor night and day.

Yes, a mechanic leads a gay life, if you say it quick and with reverse English.

Cheap Delivery Plans

Edison and Ward Company
Collaborate to Solve
Distribution

NEW YORK, Sept. 28—Thomas A. Edison, the inventor, and the Ward Motor Vehicle Co., of this city, have evolved a plan whereby almost every merchant can make his deliveries by electric motor vehicle at such a low cost that the use of horses for the same work will be the height of extravagance, it is claimed. Edison has agreed to rent his alkaline storage battery at a nominal price per month and the Ward company has offered to sell a 750-pound delivery wagon for \$875 on easy monthly payments, with 1 year's rental of the Edison battery included. The plan is to be tried out in New York and New Jersey and may be extended to other cities in the future if it materializes along the lines its sponsors contemplate for it. It is believed merchants will see the efficacy of the move and lend their support.

DISBAND AND JOIN E. V. A.

Chicago, Sept. 28—By unanimous vote, the Electric Garage and Dealers' Association disbanded tonight and the same vote carried a recommendation that all members of the dissolved body join the Chicago section of the Electric Vehicle Association, since it was the consensus of opinion that the aims and purposes of the



Harry Getz mixed sodas in a Chicago drug store before he accepted a job as oil pumper for Ray Harroun

E. V. A. were in harmony with the purposes of the passing organization. The treasury balance in the Electric Garage and Dealers' Association was voted to be given to charity.

MUST CONTRACT FOR SPACE EARLY

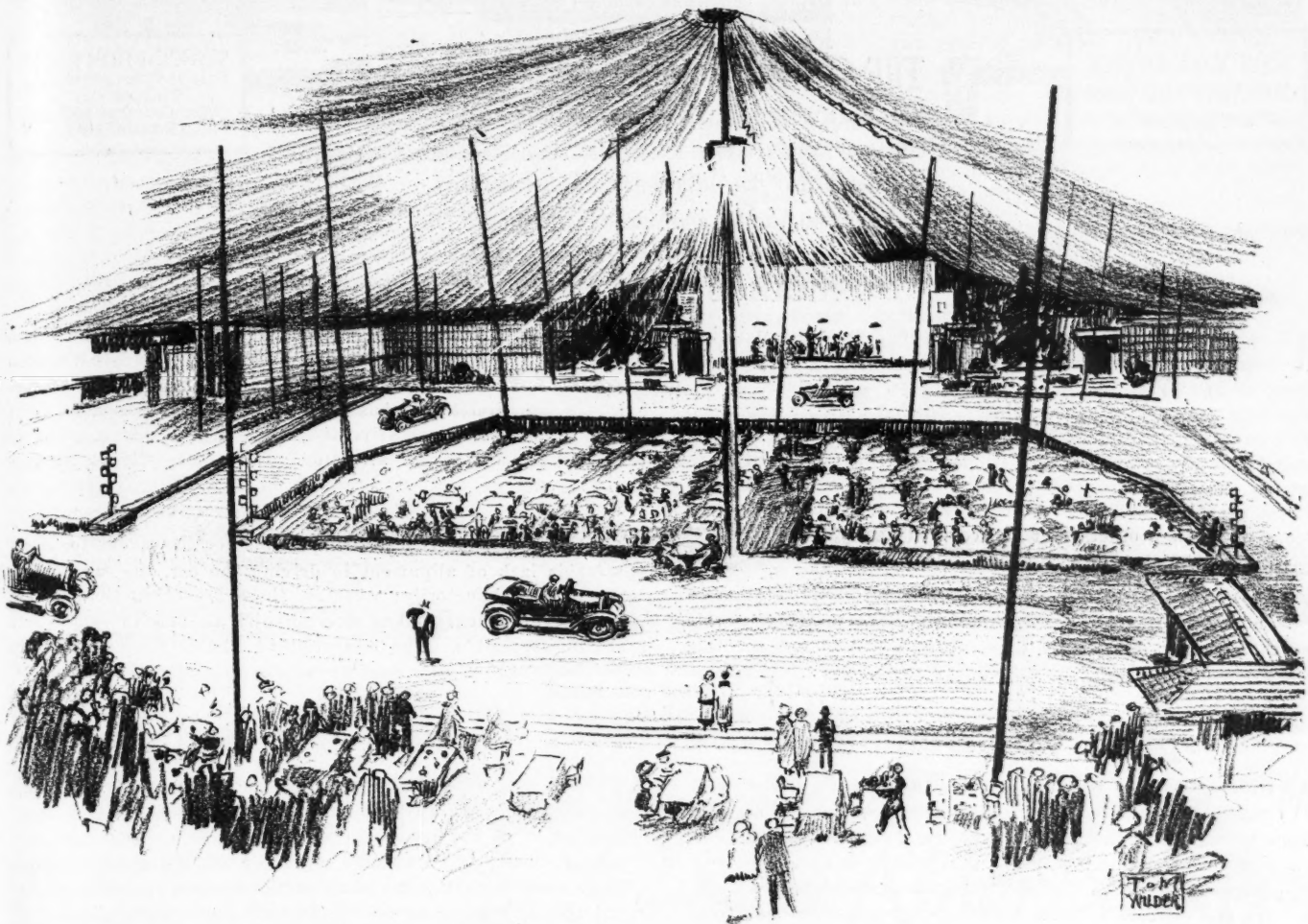
New York, Sept. 25—Definite plans are well under way for the sixteenth annual national motor show in New York next January, also the sixteenth national show in Chicago. Application blanks and diagrams for these shows of 1916 have been sent by the National Automobile Chamber of Commerce to those manufacturers who have been invited to participate, with the announcement that those desiring space must apply not later than October 2 to be considered in the first allotment, which will be made October 7. It is planned to stage the shows on an even greater scale than heretofore.

The New York show will be held at the Grand Central Palace from December 31, 1915, to January 8, 1916, while the Chicago show will be held at the Coliseum and Armory from January 22 to 29.



When Billy Chandler was driving a taxicab in New York, he knew several of the actors well enough to call them by their first names

Midway Garden Motor Show a Chicago Novelty



CHICAGO, September 27—New York introduced music with your meals but it remained for Chicago to serve a dash of motoring with the caviar sandwich and the joyous potion that washes it down.

The Midway Gardens, an exclusive and sylvan summer garden located at one end of the Midway Plaisance of world's fair days, this week is the scene of the first motor pageant ever staged in this country. The king and queen of Motoria, officially crowned by Mayor William Hale Thompson Saturday night, hold sway there. Owners of cars out of the ordinary are showing them and expert drivers of the city are competing nightly in contests.

The visitor at the Midway Gardens admires the lines of a luxurious cabriolet or applauds the tooling achievements of the amateur driver as he—the visitor, not the driver—eats his squab and drinks his cocktail and when he tires of the smell of gasoline and the

snarl of the horn, he may adjourn to the dancing floor and fox trot and Castle gallop until midnight.

The motor pageant, although an innovation, has tickled the popular fancy and Chicago's very best people are in attendance nightly. The program each night consists of two fixed features—an admiration parade, in which novel and decorated cars pass in review, and a slow driving contest, in which the participants roll over an elevated track at a snail-like pace.

The theatrical and moving picture stars now in the city were the attraction at the motor pageant this evening. Anita King, the Paramount girl who is touring from coast to coast in a Kissel, entered the slow driving contest; the Castles proved themselves just as versatile motorists as they are dancers, and Frank Tinney put 80 pounds of air in a tire in 13 minutes without a makeup.

HOUK NAPOLEONIC WHEEL

Chicago, Sept. 24—J. Mullane, Halifax N. S., has been declared winner by the judges of the contest promoted by the Houk company, which contest consisted in describing a picture showing a motor car stopped to change a wheel when carrying dispatches in the war zone. The car is being attacked by cavalry and also by aeroplanes. The contest required the best description of the picture, a description

in which imagination rather than literary style should be the dominating factor. The winning description by Mullane is novel and unique in that he links the detachable wheel with the name of Napoleon in an entirely original manner.

"Warfare in the twentieth century represents a marvel of scientific and mechanical innovations and the present conflict has demonstrated beyond a doubt the effectiveness of these devices.

"The practicability of those modern instruments of war to accomplish what would seem to be impossible feats of action is vividly portrayed in the picture 'Quick Change,' wherein the Houk detachable wire wheel is being successfully operated under strenuous conditions.

"Napoleon could indeed be conqueror of the world had he such in his battles. The Houk detachable wire wheel may be well termed the Napoleon of the age."



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Needless Tire Wear

IT is possible practically to wear a new front tire out in less than 200 miles, in driving at touring speed of 30 miles per hour on good macadam and bitumen roads. This almost inconceivable tire wear is not imaginary, but has actually happened, and happened within the last 2 weeks. The wear was entirely due to the front axle having slipped back on the spring clips at one side, thus throwing the front wheels out of parallel and imposing this tremendous wear on the tires. These tires were worn worse than others that had covered nearly 5,000 miles.

ONLY a couple of weeks ago Motor Age drew attention to how necessary it is for drivers to see that the front wheels of their cars are properly lined up in order to cut out this extravagance in tires. Manufacturers should give this matter

of properly lining up the front wheels the most careful attention, but, unfortunately, all of them do not. This is not due to any lack of knowledge on the part of the factory, but rather that some carelessness has taken place in the assembly. For this reason it is imperative that owners give this question of wheel alignment every attention. It is too costly to let pass idly by.

SOMETIMES it is nearly impossible for the owner to detect this lack of alignment in driving the car, the car holding the road satisfactorily; whereas, there are other times where lack of alignment makes steering difficult and in some cases nearly impossible. The measurement test is the only definite assurance that all four road wheels are aligned as they should be.

Speedway Demands

MUCH speculation is being indulged in in racing circles as to which design of speedway, the Chicago type or the New York type, will be the faster. Both are 2-mile board tracks of much the same shape, excepting that the banking on the two is quite different. The Chicago track has straight banking, the surface of the track in cross section being a straight line from the inside edge to the top; whereas, a cross section of the New York track on the banking is not a straight line but rather a curve; to be exact, a parabola.

THE question at issue is whether the parabola cross section will be as fast as the straight cross section or otherwise. With the straight cross section the banking is as steep at the inside of the track as at the outside; whereas, with the parabola the banking is very slight at the lower edge, or inside, and very steep at the top, much steeper than in the straight cross section type. The net result is that a car can travel faster on the inside of the Chicago track than on the New York one, and as the two tracks measure 2 miles on a line 3 feet from the inner edge, it is more than probable that higher lap speeds may be made on the Chicago track. On the other hand, the steeper banking on the outer edge of the New York track will permit of higher speeds than are possible on the Chicago one. For the present, the tracks are much faster than the cars and for the time being it will not be surprising if the Windy City speedway holds the lap record.

IT is generally understood that the 3-foot rule in measuring tracks is a hand-down from the days of horse racing and is scarcely fair to motor racing at speeds of 100 miles per hour or more, where the cars run practically all of the time in the middle of the track, or perhaps closer to the outside. The result is that in a 500-mile race, a car travels considerably more than 500 miles. The tracks should be divided into zones, so that if a car made a lap in the outermost zone it would get credit for the additional distance traveled, and if a lap in the innermost zone it would receive its full measure of credit that is due them.

Closed Car Selling

FROM now until January 1 is the best time to retail closed cars, and naturally the fall motor car exhibit at the country fair is one of the opportune places to exhibit closed cars, providing adequate and suitable means of exhibiting are at hand. Each week is telling the story of the success or failure of the fall fair as a place to exhibit and sell motor cars. Last week the Illinois state fair demonstrated that it is not the right way to show cars when they are scattered all over the grounds, some alongside of farm machinery, others among washing machines, others alongside of traction engines, and scores of others under ill-smelling tents and in divers places not in harmony with the exhibit.

MOTOR car dealers should awaken to the fact that the fall fair is a big asset to them if properly taken advantage of; but the fair is not properly taken advantage of when the cars are not housed in one exhibit building, as they should be. Once more the Milwaukee example can be cited as a national one. The dealers of the Cream City demonstrated that the fall fair can be made a good place, but not without strong-arm measures—going direct to the fair association and getting the best building in the grounds and then charging a nominal entry fee. What Milwaukee has done, other cities and states can do also.

IF you have been too late to get the separate buildings to show the cars in this fall, then get on the job in time and have the building ready for next fall. If there is not such a building available, again follow the Milwaukee example and get one built. It will prove worth while. Dealers have been looking for a chance to sell the closed car, for a good opportunity to exhibit it. Here is the opportunity, at the opportune moment. Too often the winter show comes too late, at the very end of the season for selling closed cars. The fall fair field affords an excellent solution. Closed cars are increasing in popularity every year, the demand this season is greater than ever before. It is extending to the smaller cities and towns, the places well reached through the fall fair.

License Number More Than Tin Plate

Outside of One's Own State the Little Tag Is Symbolic
of a Friend from Home

BLOOMINGTON, Ill., Sept. 27.—There is more to the license of a motor car issued by a state than the fact that it is a small section of tin with symbolic letters and numbers. In one's own commonwealth, the license plate has but small interest, but let the resident of Illinois, or Indiana, or Ohio, leave his home base and tour some other state, and there is a different story to tell.

Everybody knows the Illinois license plate for the present year, the dark blue figures upon the orange background. One can recognize it a long distance off. It is in striking contrast with the plate of the preceding year and also those of other states. Not until the Illinois tourist rolls into Indiana or Ohio or some other distant state, does it occur that the Illinois plate is surpassingly beautiful. The measure of attraction is regulated by the distance from home.

The Illinois plate does not appear lovely in Illinois where one sees them by the thousands but in Kansas or Nebraska, the plate from Illinois takes on an unusual interest. A few states farther away and one's interest in the blue and gold is still greater. The interest increases directly as the square of the distance. On the Death Valley road in California, the Illinois hails a driver of an Illinois car as a long-lost brother. In Asia Minor, doubtless, he would fall upon the neck of the man at the wheel and weep. No matter whether Cairo and Galena separated them when at home, they would become one and inseparable when meeting by chance in some other land. No matter if one was a fugitive from justice and the other preaching salvation to the heathen, the blue and gold number plate would be the bond of fraternity, greater than that of any secret society with mysterious oaths and solemn ceremonies.

In Cincinnati, for instance, which is not very far from Illinois, the tourist becomes accustomed to the white background and black figures of the Ohio license numbers. The red on white of the Kentucky plates are frequently seen in Cincinnati and every now and then one sees the crushed strawberry and dark green of the Indiana plate. Suddenly one sees a fat man with a red face and in shirt sleeves driving a mud-bespattered Ford with a worse bespattered blue and orange plate. One feels like waving a hat and shouting "Hey there." It may be that you are from Carbondale and he from Galena, but this does not make any difference. He is your neighbor if he is from Illinois and one has an overwhelming desire to stop him and talk about Illinois.

Without a doubt, the license plate of a

motor car is the great emblem of motor-ing Masonry and all car owners are brothers when they carry number plates issued by the same commonwealth. Even if the

tourist does not own a car, he is irresistibly drawn towards the man from his own state who does, when they meet in some foreign commonwealth. He has the sign and grip of a fellow citizen and one is happy to fraternize with him.

Great is the number plate! It has taken on a new value and is never so greatly appreciated as when it looms up on some other car and proves to have been issued by your home state.

THE BADGE OF MOTOR MASONRY

By William K. Gibbs

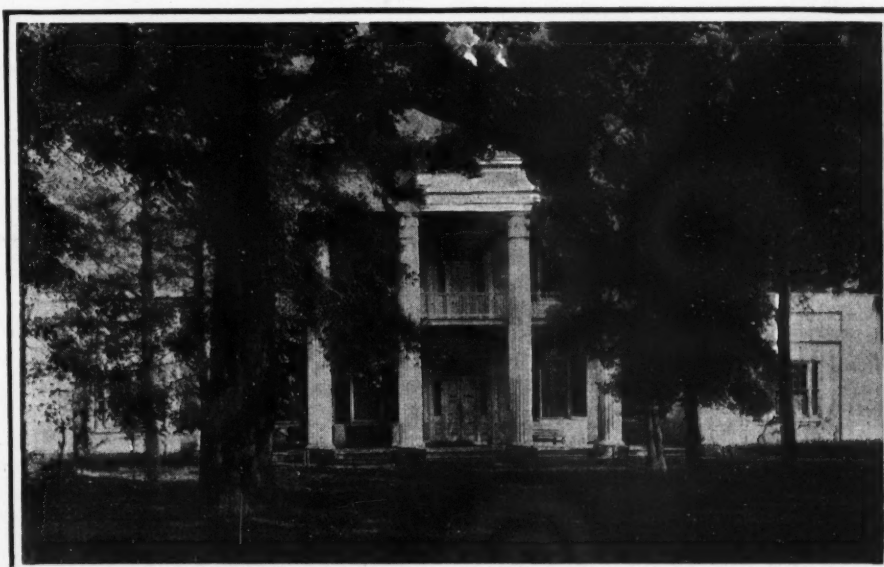
From Maine to California, from Dominion to the Gulf,
I'm found on ev'ry highway, on each boulevard and street;
Whene'er I draw attention, it is quite within convention,
To salute most any motorist whom one may chance to meet.

I furnish the insignia for the motor legion grand;
I represent the owner and the driver brotherhood.
When member meets a member on the trails in foreign states,
There's a friendly feeling 'twixt them, quite eas'ly understood.

Though I am not omnipresent, I ride both fore and aft,
Thus the better to be seen and my message outward send.
When outside my native state, though I'm just a number-plate,
I form the missing link between the stranger and a friend.

My sisters and my brothers, they are like me, yet they're not;
Some are muddy, dark and dim, some are bright—a sight to see;
Of my colors I don't prate; I am just a number-plate,
But still I'm proud that I'm the badge of motor masonry.

See America First —
• • • See America Now



EDITOR'S NOTE—This is the forty-sixth of a series of illustrations and thumb-nail sketches of scenic and historic wonders of America to be published in Motor Age for the purpose of calling the attention of motorists to the picturesque points of interest in their own country.

No. 46—HOME OF GENERAL ANDREW JACKSON, NEAR NASHVILLE, TENN.

TOURISTS making Florida and other southern states their objective this winter will find at Nashville, Tenn., the old home of General Andrew Jackson, known as the Hermitage. This old structure is one of the historic points of interest in the Tennessee city and is maintained by the Ladies' Hermitage Association. It is visited by many hundreds of travelers every year.

Eighteen Cars in Astor Cup Contest

Lack of Drivers, Slow Preparation and Accidents Cut Down Field for Saturday's Race

NEW YORK, Sept. 28—Special telegram—About eighteen cars will start in the 350-mile race on the Sheepshead Bay speedway Saturday, the original entry of thirty being reduced to this figure by some not being in running condition, others withdrawn for lack of drivers, and still others eliminated by accidents. The latest elimination was the Maxwell, driven by Harry Grant, which took fire in Monday's practice, when Grant was severely, although not fatally burned, and the car badly damaged.

The two Mercers, which were to have been driven by Eddie Pullen and Guy Ruckstell, were withdrawn today because of engine trouble.

Only one F. R. P., with a Knight motor, will compete; the Peugeot, which Ralph Mulford was to have driven, is not ready, and it may be impossible to get the Delage, entered by Harry S. Harkness, president of the speedway, tuned up in time. Other withdrawals are the Bugatti, Sunbeam, and one of the Stutz cars. It is uncertain whether the Erwin Specials, generally known as the Bergdolls, will appear or not.

Elimination trials to determine the order of starting in Saturday's race are progressing slowly, fourteen cars having taken their trials to date. So far, only one of the cars has had difficulty setting an average of over 85 miles per hour. Resta's Peugeot holds the track record in these trials at 106 miles per hour. Higher speeds are possible, but all the drivers are holding themselves more or less in reserve.

Not Up to Chicago Speed

It is not certain whether the elimination trials will be as fast as on the Chicago speedway, due to the fact that with the parabola banking, the drivers are forced to drive wider and higher on the track than they did at Chicago, where straight banking is used. It has been calculated that in a lap of the 2-mile speedway here, a car travels 197 feet further when averaging 100 miles per hour than at Chicago. This is equivalent to 1 1/2 seconds per lap, which equals about 4 miles per hour. On the Chicago track, with its straight banking, it was possible to make as high speeds close to the inner edge of the track as high on the banking.

William Schimpf, ex-chairman of the contest board of the American Automobile Association, has been chosen referee of the race. The entire speedway is practically completed. The grandstand, seating 39,000, was finished in time for Saturday's trials and the bleachers now are done. The main entrance, at which fourteen rows of motor cars can enter abreast,

Results of Elimination Trials

CAR AND DRIVER	TIME	M.P.H.
Peugeot, Resta	1:08.20	106.00
Peugeot, Aitken	1:08.65	105.00
Delage, Oldfield	1:10.07	102.75
Stutz, Anderson	1:10.84	102.00
Peugeot, Burman	1:10.85	102.00
Peugeot, Wilcox	1:11.00	101.00
Stutz, Rooney	1:11.45	101.00
Maxwell, Rickenbacher	1:11.56	100.60
Stutz, Cooper	1:11.80	100.50
Maxwell, Grant	1:13.00	98.50
Pugh Special, Le Cain	1:17.25	94.30
Duesenberg, O'Donnell	1:18.32	92.00
Sebring, Haibe	1:19.29	91.00
Duesenberg, Haupt	1:20.05	89.00

is finished, and the high wire fencing, enclosing the reserved parking spaces inside the track, is in place. In fact, all details with a few minor exceptions are ready.

The Knight-motored F. R. P. car has not yet been on the track except for a few laps and no gauge of its speed possibilities has been obtained. The F. R. P. motor has been redesigned, so that there is now a water jacket between the piston and the inner sleeve, this jacket extending upwards from the base of the cylinder casting. This should result in getting the heat well away from the piston. There still remains a water jacket outside of the outer sleeve, so that the sleeves reciprocate between water jackets. The cylinders are 3.88 by 6.125 inches. Other details of the car are as they were at Indianapolis.

In addition to the fourteen cars that already have reported for the elimination trials, there are five other probable starters, as follows:

CAR	DRIVER
Mercedes.....	Ralph de Palma
F. R. P.....	Jean Porporato
Duesenberg.....	Pete Henderson
Mulford Special.....	Ira Vail
Ogren.....	Tom Alley

CALL OFF SPEEDWAY RACES

Chicago, Sept. 27—Although sanctions for two other speedway events have been granted by the contest board of the American Automobile Association, Saturday's contest on the Sheepshead Bay track probably will be the last speedway race of the 1915 season.

Directors of the Indianapolis speedway have decided to call off their 100-mile match race scheduled for October 9. The reason given for this action is that Dario Resta and Ralph de Palma have refused to participate if more than one car of any one make is permitted to enter, and in order to satisfy them the management would be forced to withdraw one of the invitations extended to Earl Cooper and Gil Anderson, the Stutz pilots, and Howdy Wileox and Johnny Aitken, who are driv-

ing the Peugeots recently purchased by the Indianapolis track.

The fall race on the Chicago speedway, carded for October 16, also has been called off, the promoters not wishing to gamble on the weather. The two main highways leading to the track also are torn up and probably will not be repaired until the last of next month.

There is some talk among the owners of the Des Moines track to take the Chicago date and run a 100-mile race there October 16, but it is thought that the promoters will be forced to abandon such plans when they start to solicit entries, as the drivers are ready to let the curtain drop and spend a few weeks at home.

SURVEY FOR LOS ANGELES SPEEDWAY

Los Angeles, Cal., Sept. 25—Los Angeles will be a link in the speedway chain that has been forged this year and a new board track will be completed here early in the spring. Preliminary work already has been started on the course and surveys now are being made on the 300-acre tract near Bell Station recently purchased by the Los Angeles Speedway Association as the site of the plant. The contracting engineer probably will be George H. Shank, the miracle man of Chicago, who was in charge of the construction of the board track on the outskirts of the Illinois metropolis.

IMPERIAL FOUR NOW \$850

Jackson, Mich., Sept. 24—Effective yesterday, according to an announcement made by J. I. Handley, vice-president and general manager of the Mutual Motors Co., maker of the Marion and Imperial, the price of the Imperial four will be \$850. This is a cut from \$995, made effective July 1 this year and a reduction of \$235 since last season. The price of the Imperial six remains the same.

ABANDON CORONA ROAD RACE

Corona, Cal., Sept. 25—The Corona road race is dead and there is little chance of any road races in California this season.

When the race was postponed from November 20 to a holiday date because of highway construction work on the main routes into Corona, interest in the event waned; but when a wire came from the east stating that Chairman Kennerdell of the A. A. A. contest board absolutely refused to grant a sanction for the race if it was advertised as a road race, the citizens of Corona decided to pass up the classic and rest on their laurels.

It seems that the chairman of the contest board is in favor of putting the Corona race in a special class and calling it a boulevard race.

The rumor that reached the east to the effect that Corona might go after the Vanderbilt Cup and grand prize for the coming season, was unfounded. There was some talk at Santa Monica of making a bid for the races as there are a number

of road race boosters in the seaside city who are willing to guarantee a purse fully as large as that offered at Corona last year; but when word came from the east that the drivers demanded at least \$20,000 in purses and expense money, the Santa Monica enthusiasts decided that road racing was the most unpopular sport in the world.

AMES AT LESS THAN \$1,000

Owensboro, Ky., Sept. 28—The new small six model, which will be announced soon by the Ames Motor Car Co., Inc., of Owensboro, will be listed at less than \$1,000, according to the maker. A Continental motor, having a 3¼-inch bore and a 4½-inch stroke, will be used.

GAS COSTS 1 CENT MORE

Milwaukee, Wis., Sept. 28—In common with other markets, gasoline prices in Milwaukee have been raised 1 cent. Both standard and independents have announced the advance, attributing it to an increase of 1 cent in the price of crude. The advance is due largely to the falling off in the supply in the Cushing fields in Oklahoma. So-called low test gasoline is selling for 11½ cents at filling station; 65 per cent at 15 cents and other grades correspondingly higher. Prices, however, are lower than a year ago.

CAN SELL GASOLINE ON SUNDAY

Austin, Tex., Sept. 28—According to a ruling of the state attorney-general's department, gasoline is a "provision and a domestic necessity," and as such it can be sold on Sunday mornings up to the hour of 9 o'clock. One of the state's blue laws permits the sale of certain foodstuffs, produce and milk before 9 o'clock in the morning on Sundays.

While gasoline is not mentioned in the law, the attorney-general holds that it comes within the exempted "provisions." However, the enforcement of the so-called Sunday law as to gasoline and other articles and goods is confined to only a few towns of the state.

Cadillac Does Century at 72.49 M.P.H.

Establishes New Speed for Touring Cars on Board Oval— Two Eights Total 209 Miles in 167 Minutes

CHICAGO, Sept. 27—In a test run just made on the 2-mile board speedway at Chicago and under the supervision of the Automobile Club of America, an eight-cylinder Cadillac touring car covered 100 miles in 82 minutes 46 seconds. The fastest lap was made in 1 minute 38½ seconds, or at a speed of 73.17 m. p. h. The average speed for the total distance was 72.49 m. p. h. This speed was attained with the windshield open and the top down.

Two of the regular Cadillac touring models of the latest type were driven to Chicago from Detroit for the tests. They were of the 1916 design, known as type 53, and while one of them had been used for some experimental work prior to its performance on the speedway, the car which attained the best speed had never been driven at all previous to its trip over the roads to Chicago. It was taken from regular production, and had run approximately 345 miles up to the time the tests began.

Two 100-Mile Runs

Both cars were put through 100-mile runs, and their performance was strikingly uniform, the second car beating the first by 1 minute 30 seconds for the 100 miles. Each car also was given a 1-hour test, the new car traveling 72.41 miles in that period, which distance was 1.35 mile farther than the other ran in 1 hour.

The older car traveled the 100 miles in 84 minutes 16½ seconds, or at the rate of 71.19 m. p. h.

The first test run was made with the experimental car. It was driven for 1 hour with top and windshield up and side curtains on, doing 69.51 miles in that time. For the even 35 laps, or 70 miles, the time was 60 minutes 25½ seconds.

Then a run was made with the same car,

but with top and windshield down. In an hour 71.06 miles were covered, and 35 laps were made in 59 minutes 12 seconds. But without stopping the car, it was kept going for 15 laps more, or a total of 100 miles, doing it as above.

The third and final run was made with the new car. This had top down and windshield open, going 72.41 miles in the hour, and doing 100 miles in 82 minutes 46 seconds or at 72.49 m. p. h. It was during the latter part of this run that the fastest time of the entire test was made. This run probably would have been continued further had it not been for the darkness making the speed dangerous.

Consistent Running a Feature

A feature of the tests was undoubtedly the uniformity and consistency of running of the two cars. They were of the seven-passenger type, had wire wheels, carried extra wheel and tire and were equipped in all respects as they would be for ordinary use. Certification has been made to the A. C. A. that the cars were standard models with the exception of the wire wheels, which are not standard equipment.

The cars were driven by W. J. Davidson and Philip Robertson, members of the experimental and engineering departments of the Cadillac organization. Neither driver had ever raced a car before, nor had they been on the Chicago track. It is stated that the tests were conducted primarily for trying out certain of the Cadillac principles in design, and that the speed accomplishments were merely incidental thereto.

Although the official time by laps is not yet available, because it has not yet been checked by the A. C. A., a feature of it is that the speed increased as the runs proceeded, and there was no undue heating. The motometer showed 150 degrees at the end of the last run, which was affected somewhat by the evening coolness, whereas, at the end of the other tests, the temperature was not above 170 degrees. These temperatures are said to be normal.

ELECTRIC IN 504-MILE TOUR

New York, Sept. 25—Driving a Waverley electric across the state, Charles S. Chamberlain recently completed a 504-mile tour from Buffalo to this city in 4 days. He hoped to make the trip in 3 days but inadequate charging facilities in Albany and Poughkeepsie and detours necessary by road repairs kept him from maintaining his advance schedule. Ninety-four kilowatt hours were consumed in covering the 504 miles, an average of 18 kilowatt hours per mile. This represents a cost of less than 1 cent per mile for the distance.



Cadillac eight in its record test on the Chicago board oval

Owen Magnetic Car Given 800-Mile Demonstration

Run Through the Adirondacks and the Berkshires Shows Feasibility of Electric Transmission on All Kinds of Roads

NEW YORK, Sept. 27—The first public long-distance demonstration of the Owen magnetic car was made last week when the manufacturer made a tour of over 800 miles from New York City north through Albany, Lake George and Plattsburg, around the northern end of Lake Champlain, and back to New York by way of Burlington, Rutland, Manchester and

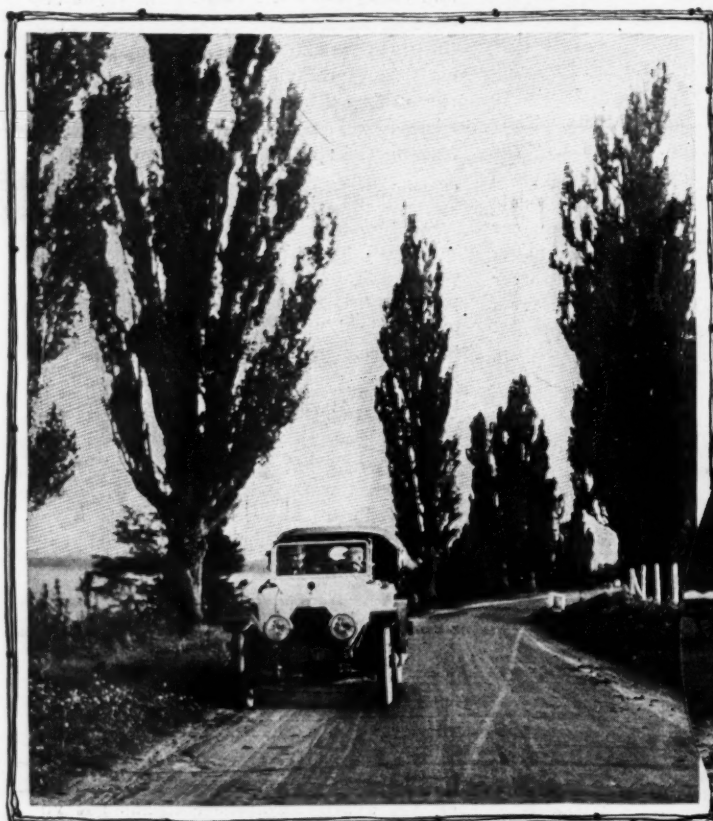
Pittsfield. Five cars made the trip, these carrying press representatives from this city. The tour was expressly for the purpose of showing what the Owen car, with its electric transmission instead of the conventional clutch and gearset, will do on all kinds of roads.

The route was over a typical one which led through the heart of the Adirondack mountains and also through the Green mountains and the Berkshires. There were long steep mountain grades and long descents. One day of heavy rain

was encountered. The trip incorporated typical touring conditions so far as weather and roads were concerned.

The five Owen cars gave as good a demonstration as could be wished for; in fact, there was nothing that savored of unfavorable performance in the entire 4,000 miles covered by the five cars which were driven nearly half of the distance by press representatives in order that they might get a correct gauge on their performance. These representatives invariably handled them through the mountain sections where difficulties would be most likely to arise if such were to occur.

In driving a magnetic car, there are many entirely different conditions met with, all of which are highly favorable to the electric type of transmission. Fore-



SNAPSHOTS OF THE OWEN MAGNETIC CAR RUN
Above—Road to Elizabeth along Lake Champlain. Right—On the highway to Rutland. Below—In the Berkshire hills





most comes the pleasant coasting qualities of the car. When descending a hill, the car can overrun the motor at will, the same as in a conventional car with a gear-set when the clutch is released; but in the magnetic this coasting occurs automatically, the driver not having to do anything. When the driver wishes to bring the motor again into use as the coasting is nearly finished, there is nothing to do but press the accelerator and the car moves on without the slightest jerking.

Another pleasant feature of driving is the electric brake in which the braking is accomplished by the electric motor on the propeller shaft, this motor being converted into an electric generator which produces electricity when the brake is applied. This brake is applied by the small controller handle above the steering wheel which gives the different speed ratios of the electric transmission system. It is only necessary to move this lever, which is little larger than the throttle or spark lever on the conventional car, to what is called the neutral position to apply to brake which very rapidly reduces the speed of the car to 15 miles per hour on the steepest grade and holds it there. In one descent over a mile long in the Adirondacks, this brake demonstrated its effectiveness perfectly. An excellent feature in connection with using this electric brake is that when it is applied, the power of the engine is automatically cut off and immediately the brake is taken off, the controller lever cuts into the forward speeds as needed.

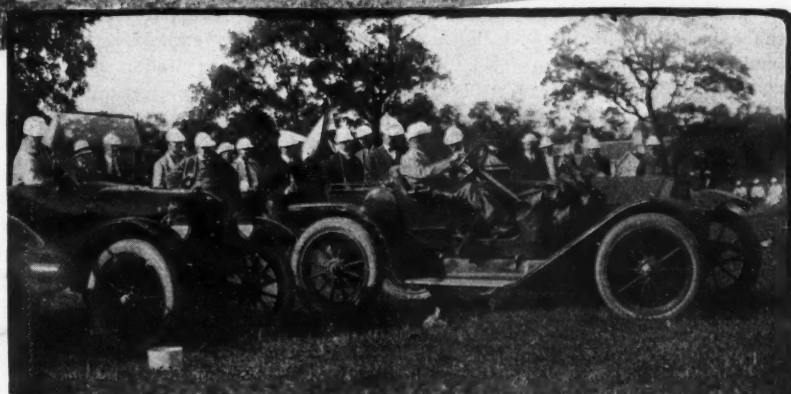
System in Brief

The car is provided with seven forward speeds through the electric transmission, all of these being obtained through the small controller lever referred to. There is no neutral positions between these speeds but you pass along from one to the other progressively. What is known as high-speed is used for all ordinary running and it is only on steep grades that lower speeds are used. In the lower speeds,

an electric motor on the propeller shaft assists in driving the car, this motor receiving its electric current direct from the generator which corresponds with the clutch, a storage battery not being necessary to supply the current. There is a direct drive on all speeds, the only difference between the high and low speeds being that there is greater slippage between the fields and armature of the electric motor on lower gears than on high. On high the slippage is approximately 40 revolutions per minute when the gasoline engine is operating at 1,000 r.p.m.

NEW YORK DEALERS IN FROLIC

New York, Sept. 23—Over 150 New York dealers played and gamboled over the broad acres of Fred Wagner's farm at



NEW YORK DEALERS SHAKE BUSINESS FOR DAY OF FROLIC

Upper left—Teeing off. Upper right—Wheelbarrow race. Center—Gathered about the festive board. Bottom—Checking in at Fred Wagner's farm

Smithtown, L. I., today. Care and dignity were thrust aside and mirth and merriment reigned supreme, for this was the annual outing day of the Big Village Motor Boosters, and the fifth event of its kind.

The farm is situated about 50 miles from the metropolis, and such an early start was required that it was necessary to open the exercises with a hearty breakfast. A baseball game followed, and after this there were various contests including a wheelbarrow race, fat men's race, three-legged race, gymkanna race, slow speed contest, forward and reverse race, etc. Handsome prizes were awarded the winners of each event.

The program concluded with a regular old-fashioned clambake, and the presentation of the prizes by Al. Reeves.

Hoosier S. A. E. in First of Winter Season Sessions

Vincent Draws Comparisons Between Different Types of Motors— Engineers' Motor Reserve is Planned

INDIANAPOLIS, Ind., Sept. 25—Last night a record meeting of over 350 members and visitors attended the reading of the two papers scheduled for the opening session of the winter season of the Indiana section of the Society of Automobile Engineers. The papers presented were by J. G. Vincent on the twelve-cylinder engine, and by James E. Diamond, on the aluminum piston, Mr. Vincent's paper being almost identical with that read by him in Detroit on Sept. 16. At the previous meeting, O. E. Hunt, chief engineer of the Packard Motor Car Co., read the paper for the author, so as to leave him with an untired voice when discussion commenced, and this idea worked out so well at Detroit it was repeated at Indianapolis.

Continued Discussions

A novel detail of procedure was the reading of Mr. Diamond's paper immediately after Mr. Hunt had finished, thus opening the discussion on both papers at once. The scheme worked out extremely well and it seemed that both papers received full consideration, while the time saved was considerable, as in many instances speakers dealt with both papers simultaneously.

The business report was read first and showed the section to be in excellent condition financially, many local manufacturers having given substantial donations to its funds. F. E. Moskovics was in the chair and spoke briefly on the section. He said that J. G. Vincent deserved the greatest possible credit for the way in which his tests on the Indianapolis speedway had been conducted with the utmost freedom and publicity. At Mr. Vincent's

invitation, other engineers had handled the Packard cars, which had been tried out on the track for many days previous. These visitors had returned the compliment with their experimental chassis and it was an honor to belong to a section and to a society that could boast men so broad-gaged as these engineers.

Suggests Motor Reserve

Coker F. Clarkson, general manager of the S. A. E., came from New York to attend the meeting and he spoke in similar strain, congratulating the section on its activity and good feeling. He also mentioned the motor reserve which has been suggested as a matter of vital interest to the army authorities and a fit subject for the S. A. E. to consider. The society has no official action in immediate contemplation, but considers the subject one that ought to be discussed so that various schemes may be thought out. On the suggestion of W. G. Wall, of the National Motor Vehicle Co., it was decided to appoint a committee to consider the establishment of a motor reserve corps by the Indiana section.

Among the points brought out by Mr. Vincent in explaining the advantages of the twelve-cylinder motor as compared with other smaller multiples, he told of the fundamental reasons why the Packard company concluded to adopt a twin-six power plant for its cars. First, he told of the forces of inertia which must be dealt with in engine design and showed how they cancel out in the twelve, if properly designed.

Mr. Vincent compared the Packard six-cylinder motor with a possible twin four having the same power and displacement.

He said the twin four would have certain advantages over the Packard six and some disadvantages would be found. He said the six-cylinder motor is in absolute theoretical and practical balance, provided it is properly designed with a crankcase that is strong enough to take care of the inertia forces properly to cancel them out. Proceeding on the theory that the six is in perfect balance, he said there was no reason why two sixes cannot be combined and still have a motor that is in perfect balance.

J. E. Diamond, engineer Aluminum Castings Co., Cleveland, O., in his address on aluminum alloy pistons, said, in part, as follows:

The weight of the aluminum alloy pistons is, roughly speaking, but one-third that of an iron piston of the same design. It immediately follows that the inertia forces due to the purely reciprocating mass, that is, the piston itself, may be reduced approximately 67 per cent by its use.

Advantages of Aluminum

Incidental to these advantages it may be said that its bearing qualities are excellent, its coefficient of friction being but approximately 50 per cent that of cast iron. A slight gain in mechanical efficiency should result, and possibly the reduced friction explains a decided decrease in the consumption of lubricating oil in several cases that have come under my observation at one time or another, where the iron pistons have been displaced by Lynite pistons. Doubtless, too, the much greater thermal conductivity of the aluminum piston plays a part in this result. In any event, it seems reasonable to suppose that less friction would reflect itself in a smaller consumption of oil.

Another feature will commend this type of piston to you. Should a motor overheat and a piston seize, only in rare cases does harm to the latter result, and practically never is injury done the cylinder. On the other hand, if piston seizure occurs in an iron-pistoned motor, reboring and regrinding are the usual order, frequently a new cylinder block being required.

One question that invariably arises is relative to the greater expansion of aluminum, and the clearances required. No set rule can be laid down. The proper clearances must be determined by experiment for each particular type of motor. In many cases if the piston barrel is tapered, it is possible to eliminate entirely piston slap.



Opening meeting of the Hoosier section of the Society of Automobile Engineers

Dealers Find State Fair Visitors Ready Buyers

Bad Weather and Lack of Cattle and Hog Exhibits Keep Many Away, but Illinoisans Flock to Motor Show During Last Days

SPRINGFIELD, Ill., Sept. 24—Political henchmen and admirers of Illinois gubernatorial candidates compensated to a certain degree for lack of a certain class of attendants at the Illinois state fair by reason of the foot and mouth disease epidemic, which kept so many from the farming districts away from this year's show. The fair, which began September 17, had 2 days of rain, a 1-day church session, 2 days of cold weather and finally, on the sixth day of a 9-day event, an attendance, which broke any record for a number of years, brought many to the extensive motor car exhibit, and resulted in many sales and good prospects for future sales.

Motor car exhibitors at the fair are almost unanimous in the opinion that the present method of exhibiting cars at such an event is antiquated and loses much of its value through being scattered about the grounds and sandwiched in between other exhibits of every description. They believe that something should be done in coming years to segregate the motor car exhibits where comparison as to finish and detail of construction may be more readily accomplished by persons interested. The success of the Milwaukee show last week virtually has been shouted from the house tops; at least it has been heard by exhibitors at the Illinois state fair and considerable comment has been made, which may result in similar action next year here.

Low Price Sales Factor

It is interesting to note the wide range of opinion expressed as to the benefit to be derived from exhibiting cars at the fair show for the last 6 or 7 years have been taking their new models to the fair show for the last six or seven years and conditions changing every year and many of them look upon the material reductions in prices as a controlling factor in selling the farmer a car. Several dealers expressed the opinion that inasmuch as the farmer's money comes more slowly than that of the city buyer, he naturally spends it somewhat more conservatively and for that reason becomes a more ready purchaser this year, since he appreciates that he is getting as good if not a better car for less money than he could have done previously.

Business, both consummated and prospective, took a big boost yesterday and today, the revival coming just at a time when many of the motor car exhibitors looked upon this year's show as being a failure. Politicians by the trainloads came to Springfield all day yesterday and today, first the Republicans and then the Democrats. People from the farming districts and the small towns swarmed in evidently

intent upon learning something of the men for whom they would vote next year. It was a case of follow the leader and the leader directed the conclave through the gates of the fair grounds. Incidentally the throng was interested in the various exhibits and the motor car exhibit came in for its share of patronage. The ban against cattle and hogs undoubtedly kept the farming element away to a great extent, but withal, disappointments in this and the inclement weather, the dealers believe that when the curtain has been rung down on this year's event Saturday night enough business will have been done to show that this year has been profitable even with its drawbacks.

Farmer Graduates to Medium Price

One thing more noticeably evidenced this year than heretofore is the fact that the farmer has graduated from the low to the medium-priced car; in other words, those selling from \$1,000 to \$1,500. Careful survey of the various exhibits develops the fact that fully one-third of the cars shown have been sold on the spot and before the end of the fair it is likely dealers will have very few cars to take out of the grounds. Several times today persons were heard to inquire if they might have certain exhibited cars immediately, or when the fair was over. It seemed that several of them had wished to buy cars which their local dealers had been unable to supply on account of slow deliveries by the manufacturer.

Many new agents have been appointed during the week and some exhibitors have arranged for enough demonstrations to keep them busy for several weeks to come. Incidentally it might be said that these demonstrations are not confined exclusively to Illinois, one dealer in particular having arranged demonstrations in four adjoining states. Very few exhibitors can afford to be pessimistic after the record-breaking crowd of yesterday and today. Had they been interviewed earlier in the week perhaps less optimism would have been evidenced.

Much interest was shown in the farm tractor demonstrations held at intervals in a field opposite the main entrance to the fair grounds. The International Harvester Co. demonstrated its tractors, issuing pass-out checks to all those who wished to go out of the grounds to watch the plowing.

J. L. Watkins, of the Moon Motor Car Co., St. Louis, Mo., declared that business done at the show had been very satisfactory. All the cars in the Moon exhibit were sold yesterday and orders taken for 30 of the roadster model up till noon today. These are for future delivery.

"We have arranged for more demonstrations than we can handle in six weeks," said H. C. Arnold, of the Louis Geyler Co., Chicago, Hudson distributor. "These demonstrations cover the southern part of Illinois and parts of Missouri, Arkansas, Kentucky and Indiana. Much interest is being taken in the convertible Hudson top and I believe this one feature is a factor in making sales this year. Up to yesterday the small crowds made the outlook quite discouraging, but the clouds seemed to be clearing for us and by the end of the fair, I believe we will have done more business, dollar for dollar, than during any previous exhibition here."

J. I. Hanley, vice-president and general manager Mutual Motors Co., Jackson, Mich., arrived this morning from the factory and immediately cut the price of the Imperial four to \$850. This represents a \$145 cut since July 1 and a \$235 since the 1915 models were announced. He said the change in price had been contemplated for some time, but the company had not been ready to make announcements until today.

The Maxwell exhibit was a combination of distributor and dealer, C. J. Irwin, the Springfield agent, and W. L. Storm, district manager, Chicago, being in charge. A number of orders were taken and Mr. Storm declared that the biggest boost to the motor car industry in recent years has been the lowering of prices.

Dealer Voices Approval

C. G. Anderson, district representative of the Thomas B. Jeffery Co., Kenosha, Wis., said that more and better prospective sales had resulted from this year's exhibit than at any time during the last 6 or 7 years. Of all the cars shown in this exhibit the Jeffery four seemed to be the most popular with the farming element.

If one exhibit could be said to be more liberally patronized than others, it was the Cadillac eight, although numbers are not always buyers, so it may not be fair to say this exhibit did more actual business than some of the others. A chassis view of the eight, highly finished, with sections of the motor cut away, or glass inclosed and electric lighted, the engine being operated by the motor-generator, came in for much attention. L. W. Whitall, factory representative, was on hand to give a scientific explanation on all points in general about the eight to those interested.

Charles H. Eichinger, sales manager for the Motor Car Sales Co., Chicago, Briscoe and Argo distributor, was sold out. His only cry was, "more cars." He and his assistants sold their last car about noon, today. However, they began taking orders for future delivery.

Start Dixie Highway Tour October 9

Expect 500 Cars to Take Chicago-Miami Inspection Trip—Schedule Requires 13 Days

CHICAGO, Sept. 28—October 9, Chicago day, has been selected as the day on which officials of the Dixie Highway Association will start from this city on their first inspection tour of the motor thoroughfare that is to link Chicago with Miami, Fla. Over 500 cars are expected to leave Grant park and escort the officials over the Illinois section of the national road.

Among the notables that will participate in the tour are M. M. Allison, of Chattanooga, Tenn., president of the association; Carl G. Fisher, of Indianapolis, founder of the Lincoln and Dixie highways; Tom Taggart, the Democratic politician; and Governor Edward F. Dunne, of Illinois.

About fifty cars are expected to make the complete trip from Chicago to Miami. The Illinois escort will accompany the officials as far as the state line where they will be met by a delegation of Indiana motorists. State relays in Kentucky, Tennessee, Georgia and Florida will accompany the officials through these respective commonwealths.

The itinerary of the tour probably will

be as follows: October 9—Chicago to Danville, Ill., 145.9 miles; October 10—Danville to Indianapolis, 91.4 miles; October 11—Indianapolis to Louisville, 147.6 miles; October 12—Louisville to Nashville, 196.3 miles; October 13—Nashville to Chattanooga, 141.3 miles; October 14—Chattanooga to Atlanta, 139.5 miles; October 15—Atlanta to Macon, Ga., 95.8 miles; October 16—Macon to Albany, Ga., 118.2 miles; October 17—Albany to Tallahassee, Fla., 94.4 miles; October 18—Tallahassee to Jacksonville, Fla., 143.6 miles; October 19—Jacksonville to Cocoa, Fla., 155 miles; October 20—Cocoa to West Palm Beach, Fla., 134 miles; and October 21—West Palm Beach to Miami, 72 miles.

INTERPARK HIGHWAY PROPOSED

Denver, Colo., Sept. 24—A 3,500-mile circle highway through nine western states, to connect seven national parks and four proposed national parks, is the latest suggestion of Assistant Secretary of the Interior Stephen T. Mather, now touring

the Rocky mountain region in the interest of national park developments.

Starting northward from Denver, this proposed national parks route would reach the new Rocky Mountain national park in Colorado, the Yellowstone, Glacier, Mount Ranier, Crater Lake, Yosemite and Sequoia national parks, and also the proposed national parks at Mount Hood, Oregon, Mount Shasta and Lake Tahoe, California, and Mount Evans, Colorado. The project would call for a new road from Los Angeles across Nevada to Salt Lake City, where the route would connect with the Midland trail and reach Denver by way of Grand Junction, Glenwood Springs, Berthoud pass, Idaho Springs and Denver's municipal system of mountain parks.

WORKING FOR EAST MICHIGAN PIKE

Detroit, Mich., Sept. 28—Some of the most prominent men in the motor car industry are members of the special committee which has been appointed to further the construction of the East Michigan pike, a highway to run from Toledo, O., along the eastern shore of the lower Michigan peninsula to Mackinaw Island, a distance of about 300 miles. The committee consists of Roy D. Chapin, president of the Hudson Motor Car Co.; Alvan Macauley, vice-president and general manager of the Packard Motor Car Co.; Sidney D. Waldron, Cadillac Motor Car Co.; M. L. Pulcher, president Federal Motor Truck Co.; J. Walter Drake, president Hupp Motor Car Co.; C. C. Starkweather, manager of the Buick Motor Co.'s branch and Edward N. Hines, chairman of the Wayne County Good Roads Commission.

JACKSON WAY PLANS MADE

Nashville, Tenn., Sept. 24—The Jackson Highway Association has been made a permanent organization through the action taken at the 2-day convention, which closed here today. The road will extend from New Orleans north to Louisville, Ky., where it will take the form of a "Y," one branch going to Buffalo and the other to Chicago. It represents the amalgamation of several highway bodies. Peter Lee Atherton is president and will have headquarters in Louisville.

COMMITTEE HEADS PATHFINDER

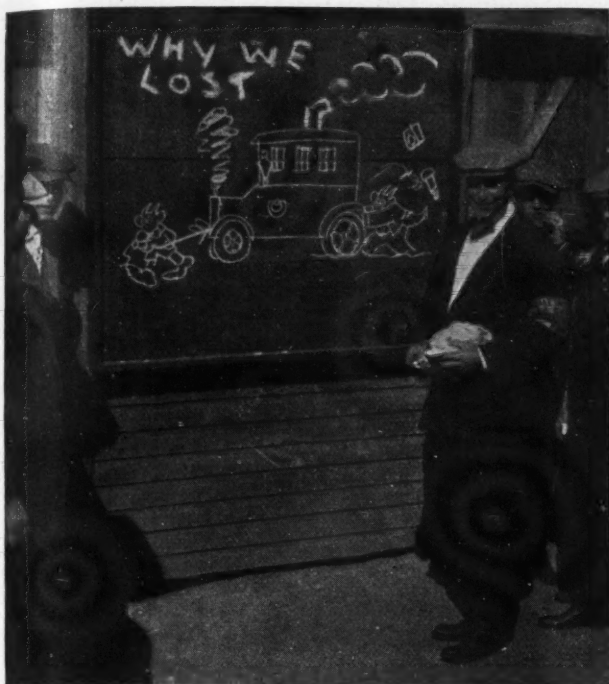
Indianapolis, Ind., Sept. 27—Management of the entire business of the Pathfinder Co. has been placed in the hands of an executive committee consisting of C. J. Root, Crawford Fairbanks, W. K. Bromley and W. C. Teasdale, Jr. Stalnaker, who was elected vice-president last June, has been elected as director and continues as general sales manager.

HEAVY DUTY ON U. S. CARS

London, Sept. 24—Special cablegram—It is declared the 33½ per cent ad valorem import duty on all motor cars and their parts will at present affect only the American manufacturers. The purchasers of



Relief map of western United States showing route of the proposed inter-park highway



Sidney Smith, cartoonist, introduces Doc Yak to Chicago interclub tourists at Joliet

American cars will have to pay the new duty, except in the case of one low-priced car. Several other American cars, however, already have put up the price, one of them being raised \$235, while a more expensive car has gone up from \$2,300 to \$3,000.

FRANCE TO LEVY IMPORT DUTY

Paris, France, Sept. 27—Special cable—On good authority, it has been declared that France will shortly follow the lead set by England by declaring a duty of 45 per cent on all American cars sold into France or its possessions.

CHICAGO TRI-CLUB RUN

Chicago, Sept. 24—The fall interclub team match between the Chicago Athletic Association, Chicago Automobile Club, and the South Shore Country Club, to Joliet and return Wednesday resulted in a division of honors between the C. A. A. and C. A. C. The Chicago Athletic Association won the Mayor's cup, which went to the team having the fewest total penalizations, while the Frank X. Mudd trophy, offered the team having the greatest number of perfect scores, was won by the Chicago Automobile Club. The South Shore Country Club had only two of its members penalized, but one of them accumulated a total of 248 points. Heretofore the interclub run has been between the motor club and the athletic association, but it was made a three-cornered affair this year by the participation of the South Shore Country Club. The match was open to both amateurs and those interested in the motor trade, who are members of any one of the three clubs. The motorists were introduced to three highways on their run.

Chandler Seeks Unique Record

Starts Non-Stop Run From Mexico to Canadian Border

SACRAMENTO, Cal., Sept. 28—With but 2 days' preparation, a Chandler six stock touring car started Sunday from Tia Juana on what is claimed to be the most strenuous tour ever attempted. From Mexico to Canada without stopping either the wheels or the motor is the record for which C. H. Hunter, of Los Angeles, and four companions are trying.

The non-wheel stop Chandler passed through here at 4 o'clock yesterday with the speedometer registering 767 miles. The total distance for the trip is 1,789 miles, and it is claimed that unless the tires blow out or the men break down under the strain the run will be completed early Thursday morning.

The men are eating and sleeping in the machine as well as taking gasoline and oil on the run from the Chandler dealers along the route. A long funnel with an elbow is used to get at the gas tank.

The run attracted such wide attention in southern California that the Universal Film Corp. sent a camera operator on the tour to tell the story of the great demonstration of the efficiency of the modern motor car in film for the Universal weekly. This is the first time that a picture company has devoted a reel to a motor car demonstration without cost to the manu-

facturer. The equipment of the car includes Goodyear cord tires, Gray & Davis starting and lighting system, Stewart speedometer, Klaxon and Sparton horns, Bosch plugs, Rayfield carbureter and Boyce motometer. Monogram oil and Standard gasoline are being used.

The Chandler passed through Marysville this morning, its total mileage there being 815 miles, or approximately half the distance to be covered.

MOVIE STAR REACHES CHICAGO

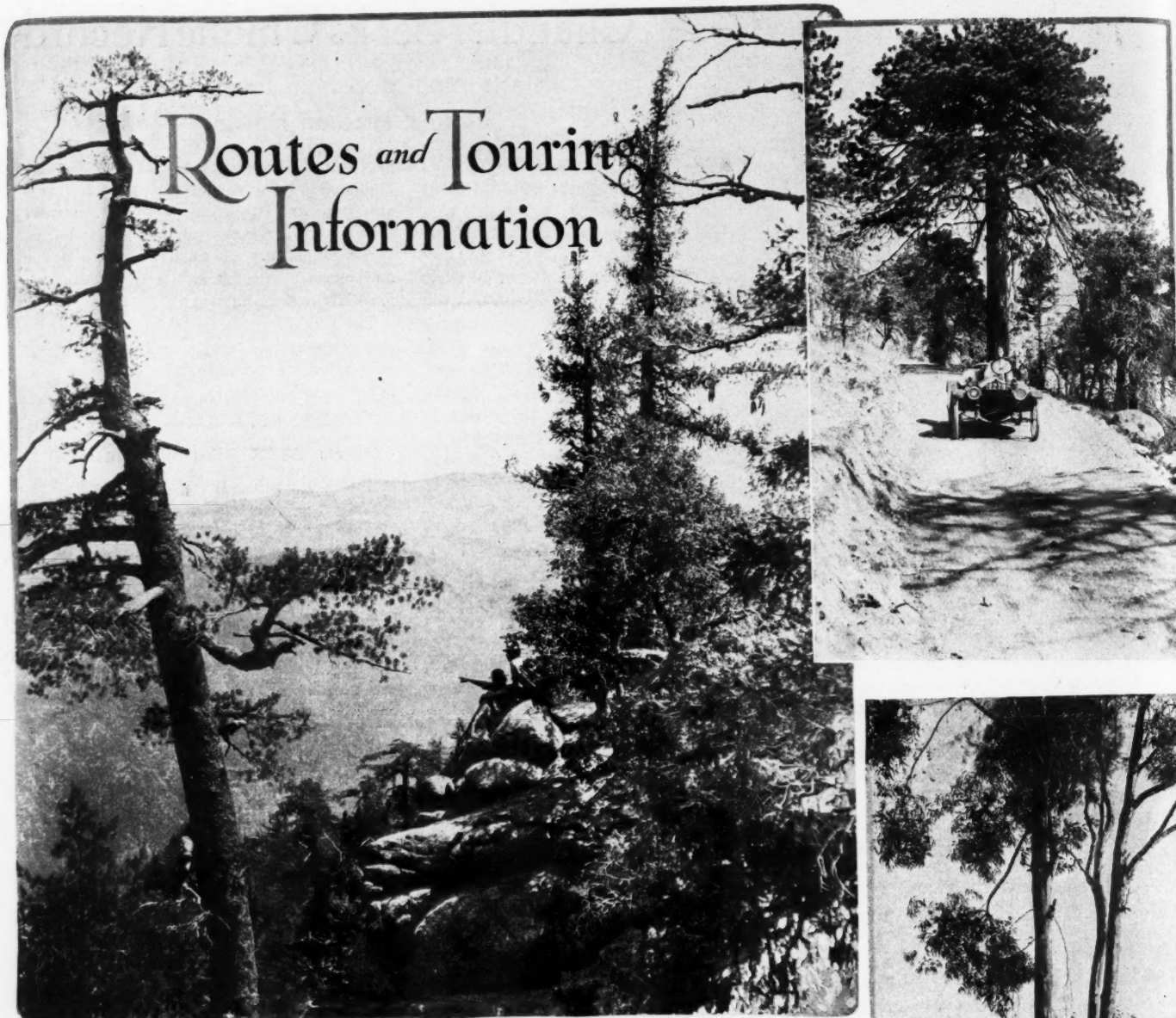
Chicago, Sept. 26—Having encountered almost as many adventures as Kathlyn and escaped about the same number of perils as Pauline in the serial films, Anita King, the moving picture actress who is driving a Kissel from Los Angeles to New York, reached Chicago this afternoon. She is the first woman driver to attempt a transcontinental trip without a companion, male or female. She has covered 3,443 miles to date and expects to reach New York by the first of next week.

In her drive from Los Angeles, she has been on the road 26 days out of 27, resting a day in Omaha, where she had her car overhauled. She has encountered no mechanical trouble en route excepting two broken fan belts and a broken spring. There is Los Angeles air in the front tires of her car and she has changed only four rear casings, three of which blew out in crossing the desert because the driver did not take the precaution of reducing the air pressure in traveling across the sand.

The Kissel that Miss King is piloting is equipped with Firestone tires, Bosch magneto and Stromberg carbureter.



Anita King, the movie star, arrives in Chicago on her lone transcontinental tour in a Kisselkar



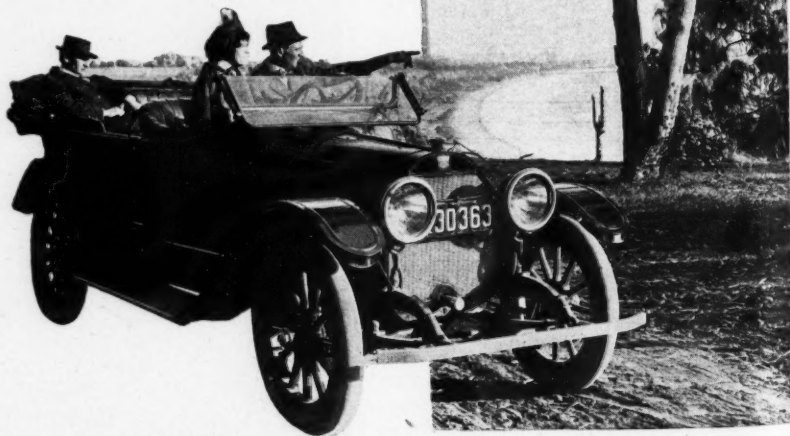
Mountain Motor Trails of Southern California Have Charm for Tourists at all Seasons of the Year

By Al. G. Waddell

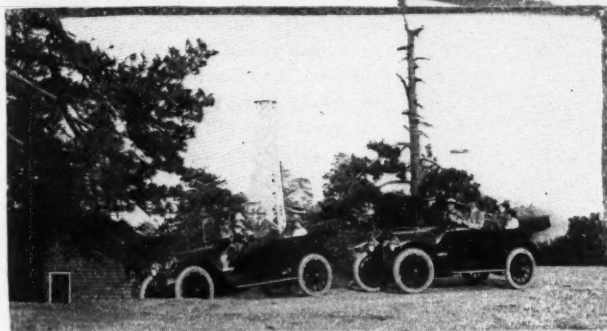
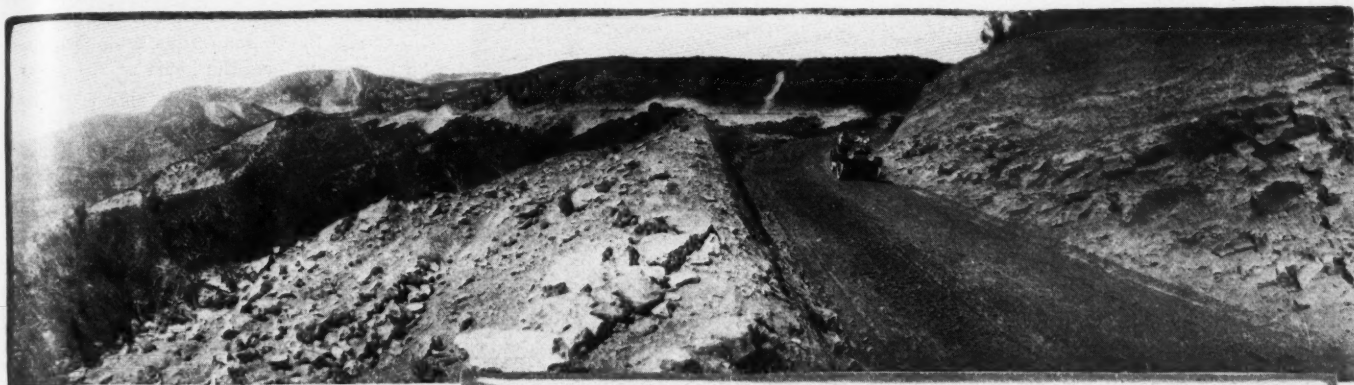
SOUTHERN California is a land of mountain motor trails. From the Mexican border to the valley beyond the San Marcos pass, the rugged slopes of the Coast range are webbed by a perfected system of highways.

For long years the San Bernardino and the Sierra Madres, the two groups in the Coast range best known to the residents of southern California, were nigh impassable. From San Jacinto and San Gorgonia, which lifts its snow-capped head 11,485 feet above the blue Pacific, to the summits of the Santa Barbaras, rising majestically a mile high in the rear of the romantic old Mission Santa Barbara, southern California's scenic wonderland frowned down upon the fertile valleys until the motor car came. With the coming of the modern motor car the forbidding peaks were scaled. The motor car conquered the deep canyons, the wooded forests and the jagged buttes.

Every mountain highway in southern California



Upper left—On the crest of Mt. San Jacinto a few yards from the mountain road. Upper right—On the road to Squirrel Inn. Below—on the palisades at Santa Monica



has an interesting history. The annals of some of the most scenic highland drives of today hawk back to the days of the Padres. Back to the days when the brave Franciscans, under the lowly Fray Junipero Serra, penetrated the mountain wilds to secure timbers to build the first pueblos of California.

Rose canyon, the Casitas and the San Marcos mountain passes are but the improved trails cut by Don Gasper de Portola and Padre Crespi on that memorable first overland journey from San Diego to San Francisco and return in 1769, which gave berth to El Camino Real, the highway of the king, which today is the famous Coast route of the new California state highway. The Topanga pass, winding through the Malibu range from Calabasas on El Camino Real to Santa Monica, was first threaded by an Indian trail. This was widened in later years by the ranchers of the Casitas district who desired a short road into Santa Monica and Los Angeles where they either sold or shipped their crops.

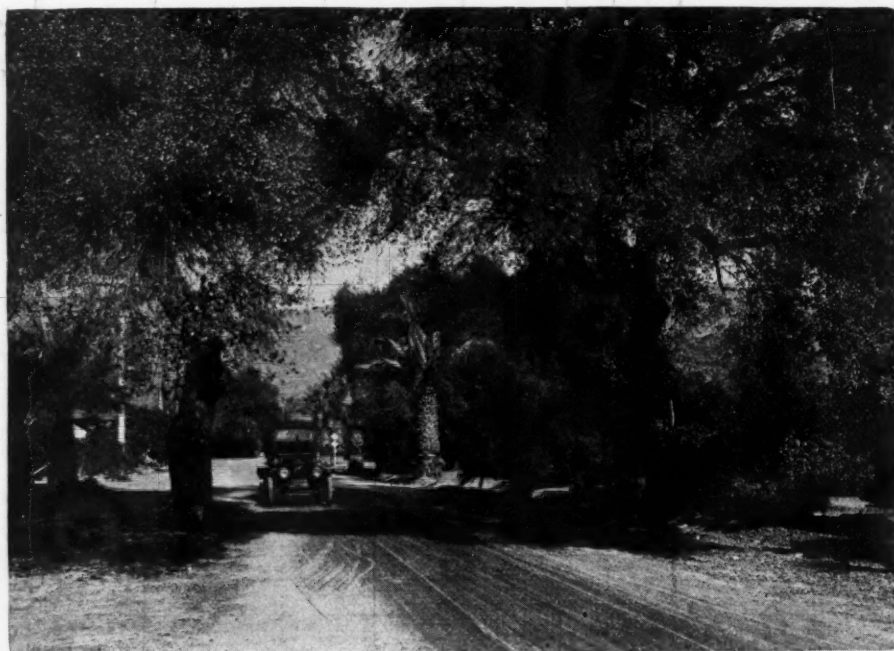
Ridge Route Engineering Feat

The new Ridge route over the Castaic mountains, which cuts off many miles on the road between Los Angeles and Bakersfield, is a modern engineering feat. The great Crest route in the San Bernardino mountains, known as "101 Miles on the Rim o' the World," also is an engineering masterpiece, but the Crest route was pioneered by the Franciscan monks who made early California history.

While the mountains remained practically unknown until the motor car came and conquered the forbidding wilds, there were a few daring mountaineers who covered the trails on foot or with pack animals, and explored the highlands which once were known only to the California



Top—Panoramic view Ridge route. Insert—On the summit of Mt. Wilson. Middle—Building the famous Ridge route. Below—Scenic drive on Lookout mountain



Famous Foothills boulevard in the shadow of the Sierra Madres

Indians. Slow as was the development of the mountain wonderland, resorts grew up along the seldom-traveled paths.

Practically every mountain road in the southern counties of California has been sign-posted by the Automobile Club of Southern California. There are danger signals at every sharp turn. Warnings have been placed on the dangerous grades and the signs also bear information regarding turnouts and water supplies along the roads with mileage marks and the elevations. Not only is mountain motoring one of the pleasures offered for the enthusiastic motorist in the Golden state, but the mountain motoring sport has been made safe for every capable driver. There is not a mountain motor trail in the entire state which should offer the least difficulty to any driver who has piloted a car across the continent.

Mt. Wilson Toll Road

One of southern California's most popular mountain drives is the Mount Wilson toll road. The distance from Los Angeles to the summit of the mountain, elevation 6,000 feet, is just 26 miles. From Altadena where the mountain road begins, to the summit, it is 9 miles. As the course winds around the mountain's edge, thousands of feet above the valley, one of the greatest sights in California is offered.

The Mount Wilson toll road was constructed at great expense for the purpose of transporting the gigantic telescope and equipment to the summit for the Carnegie Observatory. Additions are being made constantly to the observatory equipment and the tons of steel and bulky frames all have been freighted above the clouds on motor trucks. A motor stage line makes daily trips between Los Angeles and the hotel, on the summit of the mountain, throughout the year. An idea of the excellence of the road may be had from con-

sideration of the record of 29 miles made by the late Billy Carlson in a Maxwell 25 last winter with snow on the ground for the final 4 miles of the course.

Hundreds of motorists spend a night on the mountain. A view of the illumination of the valley is well worth a visitor's time. The myriad lights of Pasadena, Altadena, Los Angeles, Pomona, Long Beach, Ocean Park, Venice, Santa Monica and thirty-seven other southern California towns are spread out at the foot of the mountain, indiscribable, inspiring.

Locked in the Sierra Madres 4,100 feet high and 57 miles from Los Angeles is Camp Baldy at the end of one of southern

California's most scenic mountain drives. The Camp Baldy road runs from Pomona and Claremont into the heart of the mountains. This camp is on the slopes of San Antonio Peak, known in California as Old Baldy, which reaches a height of 10,080 feet. On one side of the camp is Iron Mountain, 8,028 feet high and on the other Telegraph Peak, 9,008 feet high.

There is an old Spanish road up Lytle Canyon to Glenn Ranch. This mountain beauty spot is but 2,750 feet up and 67 miles from Los Angeles.

Rim o' the World Route

The greatest roads of the great San Bernardino county highway system are the mountain roads from peak to peak through the San Bernardino group. This system, the pride of San Bernardino county and of all southern California, is the Crest route, "101 Miles on the Rim o' the World."

The Crest Route penetrates the sportsman's paradise of southern California. Some of the greatest fishing in the world is found in Little Bear and Big Bear lakes which have been stocked with trout by the California fish and game commission. The mountain streams also offer excellent trout fishing in season and there is an abundant supply of game. Deer shooting is one of the favorite sports in the San Bernardinos.

Out of Redlands or San Bernardino is another wonderful drive. The romantic Mill Creek Canyon road, built in the days of early California by the Padres to get the timber out of the mountains to build San Bernardino, runs up Mill Creek to Forest Home, perched 5,200 feet high on the side of Mount San Bernardino. This beautiful spot is just 88½ miles from the center of Los Angeles.

The motor car has been a great factor in the building of the Mill Creek road and



View near Skyland, 5,000 feet above San Bernardino

in the development of the mountain settlement, Forest Home. In 1839 the first ox teams dragged timbers out of Mill Creek Canyon over the road now so popular. The old sawmill erected by the Franciscans stood on the spot where a garage is today. About 21 years ago a man named Tom Akers homesteaded 160 acres in the mountains on roaring Mill Creek which took in the ruins of the old sawmill. For many years Mill Creek was famous as the best trout stream in southern California, but it was finally fished out. About 10 years ago a company bought out Akers' interests and established a summer camp on the land.

The Crest Route

While the San Bernardino Mountain motor line makes daily runs over the Crest route, touching at all the resorts and points of interest, the Mill Creek road is covered by a stage line operated by the management of the hotel and camp. A large garage is operated on the grounds for the benefit of the many private owners who visit the resort. A stock of supplies is carried at this garage offering every convenience.

Idylwild is one of the greatest mountain motor trips in all of California. This Alpine village of America is located on a highland flat at 5,800 feet elevation. It is 115 miles from Los Angeles by way of Hemet, and by way of Banning, 5 miles farther. Among the pines and rocky peaks of Mount Jacinto, more than a mile high, Idylwild is one of the most attractive spots in the Alps of southern California, visited every season by hundreds of motorists.

There are three roads through the mountains to the settlement in the shadow of old "San Jack." The first road was built by two pioneers, Joe Crawford and George Blodgett, more than 35 years ago over an

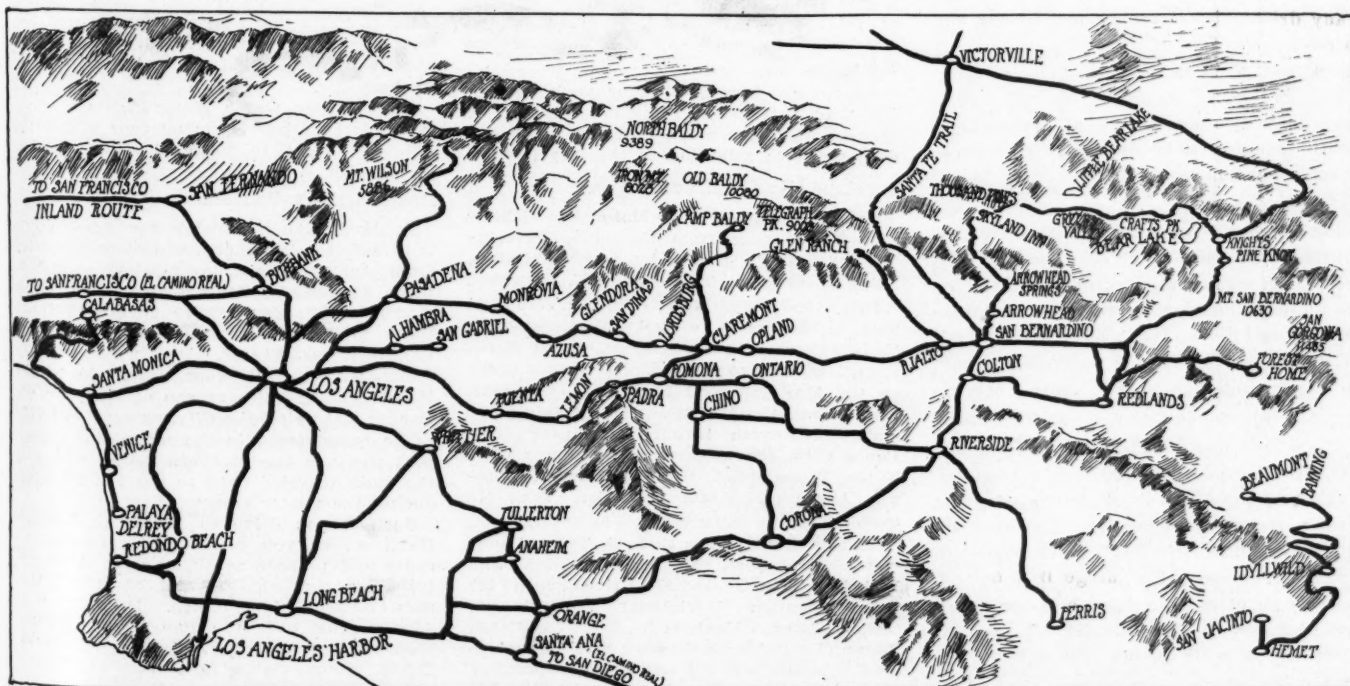


The winding road through the scenic Topanga

old Indian trail. A sled road was first constructed to the old mill in Fern Valley. This later became a wagon road, but sometimes is used by motor cars.

Leaving the foot of the old wagon road at the head of San Jacinto Canyon, the motorist climbs the mountainside, winding

over foothill crests to the timber line. At every turn there is a new panorama of the Hemet valley spread out below. A few miles from the mountain plateau where Idylwild is located, the pines are more scattered and the mountains are covered with grayish boulders which look like huge



Relief map showing network of mountain highways in southern California

fire opals in the golden light of western sunset.

There is a steep pull and a sharp turn, then the car rolls out on a level road running through a natural park, flanked on all sides by towering mountain peaks, capped overall by snow crowned domes.

Leaving the settlement on the return drive by way of Banning, the road climbs to a point several hundred feet above the natural park. From this point to the crest of the foothills back of Banning, the drive is one succession of kaleidoscopic scenic variety. At the summit of the pass, the motorist is lost in the mountains amid banks of ferns and dense pine growth. The road then winds and unwinds through the pine forests down into Dark Canyon, where massive oaks take the place of the fragrant pines.

In this canyon there are hundreds of camping places. At every camp there is a motor car. Many bear the insignia of transeontinental travel and every car from the lightest to the heaviest foreign creations are to be found hidden away in the shaded dells or simmering in the sunlight which dances through the branches of the oaks as they sway in the cool mountain winds.

Up on to another ridge the course runs. Around the heads of pine choked canyons opening below into cloud clothed foothills, the road runs through the Graveyard of the Gods. Here huge boulders weighing hundreds of tons, are piled over the mountain sides. Some balance on narrow bases threatening to fall and block deep ravines. Then again, stones big enough to build miles of city streets, are scattered about as if thrown across the range by some giant at play.

Below, the pines and massive rocks are left behind. The trail is shaded by oaks and fringed by ferns for several miles. Then a sharp turn spreads the Hemet valley out at the foot of the ridge. For many miles every turn reveals new scenery. There are small mountain farms, miniature forests, rocky ruins of nature and shady glens until the sides of Old Greyback, are presented to view across a stretch of desert.

In the sun's rays, all the tints of the painted desert are to be seen shaded with the soft greens of the nearer foothills. The road slides and warps down the mountain to the foothills and out of the Cleveland national forest on to the smooth highway, the Ocean-to-Ocean route, leading east to the Atlantic seaboard.

There are many other mountain motor trails in the southern California counties. Many are excellent short drives of great scenic value to the motorist. Almost within the city limits of Los Angeles, there are mountain drives. Up Mount Hollywood, there is an attractive drive and the winding highway to the summit of Lookout mountain is well known throughout the United States.

While many of the mountain drives do

not reach a summit higher than 5,000 feet, there are many excellent views to be had throughout the run. There is the Torrey Pines Grade near San Diego. This climbs but a few hundred feet, but lifted above the tossing breakers on the shore below with peaceful La Jolla nestled in the rocks to the south, the motorist is afforded a wonderful introduction to beautiful San Diego and the Harbor of the Sun.

There is a mountain pass between the Mission San Juan Capistrano and Elsinore.

Answers to Inquiries for Route Information

Flandreau, S. D.—Minot, N. Dak.

FLANDREAU, S. D.—Editor Motor Age—Kindly give me the best route from Flandreau, S. D., to Minot, N. D.—Roy W. Bailey.

Drive to Brookings, then go north 132 miles through Altamont, Milbank, Ortonville, and Dumont to White Rock; and 76 miles via Wahpeton, Christine and Hicks to Fargo. Continue north to Grand Forks, 95 miles, through Mapleton, Hillsbor and Reynolds. At Grand Forks turn west and drive 98 miles through Larimore, Michigan and Lakota to Devils Lake; and 149 miles through Churches Ferry, Leeds, York, Rugby, Towner, Granville and Surry to Minot, N. D.

Chicago-Grand Rapids, Mich.

Chicago—Editor Motor Age—I am planning a trip by bicycle to Grand Rapids, Mich., from Chicago, Ill. Would Motor Age suggest going via Michigan City, South Bend and Kalamazoo, or would it select some other and possibly a better route? What is the mileage, also road conditions?—John Connell.

Leave Chicago and drive through South Chicago, Hammond, Highlands, Hobart, Porter, Michigan City; then via the shore line through New Buffalo, Mich., Harbert, Bridgman and Stevensville to St. Joseph. Improved stone, gravel, dirt and macadam. Go north on the West Michigan Pike through Benton Harbor, Coloma, Watervliet, South Haven, Saugatuck, to Holland, over mostly gravel roads; then to Grand Rapids, on good gravel road, via Zeeland, Hudsonville and Grandville to Grand Rapids. Total distance 201 miles.

As to equipment, etc., for your bicycle: You had better ask some of your bicycle friends, who have made trips, as Motor Age does not give attention to the bicycle field.

Copeland, Kan.—Gulfport, Miss.

Copeland, Kan.—Editor Motor Age—Kindly give me a route from Copeland, Kan., to Gulfport, Miss., either by way of Dallas, Tex., or Memphis, Tenn.—John E. Seemann.

Drive to Dodge City, Kan., where you pick up the Santa Fe trail, going east on it to Newton, Kan., via Kinsley. Great Bend, Lyons, Hutchinson and Halstead; go south on the Meridian road 25 miles to Wichita, Kan.; leave the Meridian road at this point and drive south through Arkansas City, Ponca City, Perry, Guthrie, Oklahoma City, Noble, Wynnewood, Milburn, Durant, Denison, Howe and Anna to Dallas, Tex., 478 miles.

Go east from Dallas through Tyler, Longview, Shreveport, Monroe, Tullulah and Vicksburg, to Jackson. Drive south 179 miles through Hazlehurst, Brookhaven, Osyka, Miss., Kentwood, La., to Baton Rouge; 119 miles via Darrow and Kenner to New Orleans; and 135 miles to Gulfport, by way of Claiborne, Bogalusa, Poplarville, Vidalia and Pass Christian.

This road was originally built by the Padres from the old mission to San Juan Hot Springs, half way through the pass. From the canyon, stones were carried to build the greatest of all the missions, beautiful Capistrano.

The mountain drives are among the most expensive roads in southern California; but they are well worth the expense. Millions have been spent in the development of these highland gasoline trails, but they pay big dividends to the Golden state.

Volume 3 of the Blue Book covers this routing from Jackson, Miss., to Gulfport. Price, \$2.50; Blue Book Publishing Co., Chicago.

Litchfield, Ill.—Jacksonville, Fla.

Litchfield, Ill.—Editor Motor Age—Kindly advise us what route could be taken from Litchfield, Ill., to Jacksonville, Fla., in late October. What about the Dixie highway and where does it run?—Glenn E. Brubaker.

Drive 63 miles east to Shelbyville, and 88 miles through Mattoon, and Paris to Terre Haute. Turn south and go 63 miles on good gravel through Sullivan and Carlisle to Vincennes, Ind., and east 129 miles via Washington, Shoals, Paoli and Greenville, to Louisville, over fine stone pike and good gravel.

Route south to Nashville, 192 miles, via Mt. Washington, Bardstown, Buffalo, Bear Wallow, Glasgow, Scottsville and Gallatin, 247 miles through Murfreesboro, Huntsville, Larkinsville and Jasper to Chattanooga; 136 miles via Trion, Rome, Cartersville and Marietta to Atlanta, Ga.; 172 miles through Lithonia, Rutledge, Greensboro and Thomson to Augusta, and 132 miles via Waynesboro, Millen, Rocky Ford, Statesboro and Stilson to Savannah. It is a run of 176 miles to Jacksonville, Fla., through Riceboro, Euclonia, Darien, Brunswick, Old Sterling, Tarboro, Kings Ferry and Callahan.

The Dixie highway starts at Chicago and runs through Indianapolis, Louisville, Mammoth Cave, Nashville, Chattanooga, Atlanta and Macon, to Jacksonville, thence south to Miami. The route we have outlined from Atlanta takes you east to Augusta and Savannah to Jacksonville, instead of south through Macon, Valdosta and Live Oak to Jacksonville.

Suggest you watch Motor Age for a report of the Dixie Highway tour which the officials expect to make, leaving Chicago on October 9.

Ashland, Kan.—California

Ashland, Kan.—Editor Motor Age—Would it be safe the latter part of October to drive from Ashland, Kan., to California, and is there danger of getting tied up in a snow storm? Have you a map of the southern route and also through Denver and Salt Lake?—Robert Seacot.

Motor Age hardly counsels a trip to the Pacific coast at this season of the year via Denver and Salt Lake City, as snow is likely to be encountered in the mountains. Suggest you use the southern route, which is the main traveled road to the Pacific coast during the winter months.

Suggest you drive to Meade or Liberal, Kan., where you pick up the Borderland route and proceed south on it to Amarillo, 104 miles, through Goodwell, Stratford, Dumas and Goodnight Ranch. Drive west to Albuquerque, over the Pan Handle Pacific highway, going through Umbarger, Texico, Clovis, House, Santa Rosa, Negra and Moriarty, 377 miles. Proceed 109 miles through Kirkpatrick Spring, and Socorro to Magda-

lena, and 132 miles via Datil, Quemado, and Black Canon to Springerville. Now drive 134 miles through the Petrified Forest, the towns en route being St. Johns, Concho, Beaver Dam Wash, Petrified Forest and Holbrook. A run of 63 miles brings you into Flagstaff, and 84 miles through Grand View to Grand Canyon.

Leaving the Grand Canyon, drive to Williams, Ariz., 63 miles, and through Bellemont, Williams, Ash Fork, Seligman, Peach Springs and Hackberry to Kingman, 173 miles. Needles is 72 miles away and is reached through Yucca and Topock Bridge. Drive 165 miles through Goffs, Bagdad and Ludlow to Barstow; 79 miles via Victorville, and Hesperia to San Bernardino, and 63 miles by way of Claremont, Monrovia and Pasadena to Los Angeles.

This route is somewhat longer than through Phoenix, but by going this way you will have an opportunity of visiting the Grand Canyon of Colorado and the Petrified Forest. Volume 5 of the Blue Book contains complete running directions.

Shreveport, La.-Washington, D. C.

Natchitoches, La.—Editor Motor Age—Kindly give me information on the best road from Shreveport, La., to Washington, D. C., via St. Louis, Jackson, Miss., or Memphis, Tenn.—J. B. Aswell.

From Shreveport drive east through Vicksburg, Jackson, Brandon, Meridian, Livingston, Eutaw, Tuscaloosa and Bessemer to Birmingham. Then go to Chattanooga, Tenn., 136 miles, via Springville, Attalia, Killian, Sulphur Springs Station, Trenton and Wildwood.

Leave Chattanooga and drive 119 miles to Knoxville, through Cleveland, Athens, Loudon, Lenoir City and Concord, over good gravel and graded clay roads, with fine pike and macadam stretches. Go next to Bristol, Tenn., 146 miles, through New Market, Morristown, Greeneville and Johnson City; good pike and poor road for the first 100 miles, the balance new macadam.

It is 159 miles to Roanoke over macadam, good and poor pike, dirt and clay roads on which waterbars and small fords will be encountered. The way points are Liberty Hall, Marion, Newbern, Christiansburg and Salem. A good dirt road with macadam stretches extends 89 miles to Staunton, Va., through Buchanan, Natural Bridge, Lexington, Greenville and Minte Springs. Drive 91 miles to Winchester, Va., through Harrisonburg, New Market, Strasburg and Kernstown; all good pike and macadam. A 50-mile drive over good stone and macadam will take you through Rippon and Harper's Ferry to Frederick, Md., and the last stretch of 52 miles to Washington is over macadam, going through Ridgeville, Gaithersburg and Bethesda. Blue Book, volume 3, contains running directions. Price, \$2.50. Blue Book Publishing Co., Chicago.

Salina, Kan.-Columbus, Neb.

Salina, Kan.—Editor Motor Age—Kindly give routing, together with mileage, etc., covering trip from Ellsworth, Kan., to Columbus, Neb.—William E. Roskam.

Drive east to Salina, Kan.; here you pick up the Meridian highway and drive north on it to destination, the way points being Minneapolis, Concordia, Belleville, Hebron, Belvidere, Geneva, Fairmont, York, Osceola and Shelby to Columbus. Total distance, 246 miles.

Caney, Kan.-St. Louis, Mo.

Caney, Kan.—Editor Motor Age—Kindly give me the best route from Caney, Kan., to St. Louis, Mo.—W. H. Morris.

Go to Independence, then drive 124 miles through Cherryvale, Chanute, Humboldt, Garnett and Richmond to Ottawa; here pick up the Santa Fe trail and drive east 66 miles through Edgerton and Olathe to Kansas City. Proceed east to St. Louis, 319 miles, by way

of Wellington, Dover, Marshall, Arrow Rock, Boonville, crossing the Missouri river by ferry into New Franklin, Rocheport, Columbia, Mexico, Wellsville, Montgomery, New Florence, Warrenton, Wright City, and St. Charles.

Tulsa, Okla.-Sedan, Kan.

Sperry, Okla.—Editor Motor Age—Kindly give me the best route from Tulsa, Okla., to Sedan, Kan.; also, route from Tulsa, Okla., to Thayer, Mo.—A Subscriber.

Go north through Bartlesville to Caney, then west to Sedan. The route from Tulsa to Thayer, Mo., is through Claremont, Vineta, Miami, Okla., Joplin, Springfield, and Willow Springs to Thayer.

Tracy, Minn.-Davenport, Ia.

Tracy, Minn.—Editor Motor Age—Kindly give me the best route from Tracy, Minn., to Davenport, Ia., via Osage, Ia.—E. E. Tornquist.

From Tracy, drive 99 miles via Walnut Grove, Lamberton, Springfield, Sleepy Eye, New Ulm, Mankato, and 47 miles via Waseca, to Owatonna. This is over a section of the Black and Yellow Trail, very pretty drive along shores of numerous lakes. Then southeast over the Red Ball Route, 142.5 miles via Blooming Prairie, Lansing, Austin, Lyle, Minn.; St. Ansgar, Ia.; Mitchell, Osage, Floyd, Charles City, Plainfield, Waverly, Janesville, to Waterloo.

Continuing over the Red Ball Route, go via Laporte City, Vernon, Newhall, to Cedar Rapids, a distance of 65.5 miles, then through North Liberty, to Iowa City, and 58 miles east via West Liberty, Moscow, Durant, to Davenport, Ia.

Complete running directions contained in Volume 5 of the Blue Book.

Hot Springs, Ark.-Memphis, Tenn.

Hot Springs, Ark.—Editor Motor Age—Kindly give me a route from Hot Springs to Memphis, Tenn., via Helena, Ark.; also a route from Hot Springs to Shreveport and Monroe, La., via Helena, Ark.—Mrs. Elise A. Lake.

From Hot Springs route east to Little Rock, 53 miles, via Lonesdale, Fairplay, Benton and Collegeville; thence to Helena through Galloway, Lonoke, Prairie Center, Hazen and Clarendon. From Helena drive through Tunica and Lake Cormorant to Memphis.

To reach Shreveport and Monroe, La., from Memphis, you should drive first to Sumner, Miss., 120 miles, the waypoints being Lynchburg, Lake Cormorant, Clacks, Hollywood, Tunica, Dundee, Coahoma and Tutwiler; then 165 miles through Schlater, Greenwood, Lexington, Goodman, and Canton to Jackson, Miss. Turn west and drive through Vicksburg, Tullulah, Monroe, and Ruston to Shreveport. Make local inquiry at Jackson, Miss., as to running directions and road conditions on this last stretch.

Blue Book, volume 5, contains running directions of this routing from Hot Springs to Memphis, and from Memphis to Jackson. Price, \$2.50. Blue Book Publishing Co., 910 South Michigan avenue, Chicago.

South Haven, Mich.-Waterloo, Ia.

South Haven, Mich.—Editor Motor Age—Kindly give me the best route from South Haven, Mich., to Waterloo, Ia.—H. F. Charpening.

From South Haven drive through Benton Harbor, St. Joseph, New Buffalo, Grand Beach, Michigan City, Porter, Hobart, Highlands, Hammond, and South Chicago, to Chicago, a distance of 138 miles. Leaving Chicago head due west to Cedar Rapids, 238 miles, going through Lombard, Geneva, where you pick up the Lincoln highway and proceeding on it through DeKalb, Rochelle, Dixon, Sterling, Morrison, Clinton, Wheatland, Mechanicsville and Marion to Cedar Rapids.

Turn north and follow the Red Ball route

to Waterloo, a distance of 65 miles through Newhall, Vinton and Laporte City.

Ottumwa, Ia.-Columbus, O.

Ottumwa, Ia.—Editor Motor Age—Kindly give routing, distance, and usual condition of roads from Ottumwa, Ia., to Columbus, O.—William K. Breckenridge.

Follow the Blue Grass road to Burlington, Ia., 73 miles, which will take you through the towns of Fairfield, Glendale, Rome, Mt. Pleasant, New London and Middletown. Drive through Oquawka, and Monmouth to Galesburg, Ill., 50 miles. Dirt roads, good in summer weather.

Dirt, gravel and brick roads extend from Galesburg through Brimfield and Kickapoo to Peoria, 50 miles; dirt road for 51 miles through Farmer City and Mahomet to Champaign; while a gravel or stone road extends practically to Indianapolis, 128 miles through Danville, Covington, Crawfordsville, Jamestown and Brownsburg.

Routing now on the National highway drive from Indianapolis through Knightstown, Cambridge City, Richmond, Dayton, Springfield, and Harmony to Columbus, O. This highway is a good pike road through level country.

Volume 5 of the Blue Book covers the distance from Ottumwa to Burlington, and volume 4 the balance of the way. Price, \$2.50 per volume. Blue Book Publishing Co., Chicago.

Warren, Minn.-Aberdeen, S. D.

Warren, Minn.—Editor Motor Age—Kindly advise the best route from Warren, Minn., to Aberdeen, S. D., via Britton; also from Warren to Minneapolis.—M. M. Larson.

Drive to Grand Forks, then go south 95 miles through Reynolds, Hillsboro and Mapleton to Fargo; continue south through Christine, Wahpeton, White Rock, and Sisseton, 119 miles. Just beyond Sisseton, at Summit, you should pick up the Yellowstone trail and drive west on it through Waubay, Webster, Bristol and Andover. Turn north at Andover for Britton, which is only a short distance. Retrace your route to Andover and then go west to Aberdeen.

For the trip from Warren to Minneapolis, Minn., follow the routing above outlined as far as Summit; here turn east onto the Yellowstone trail and follow it through Ortonville, Appleton, Milan, Montevideo, Granite Falls, Renville, Olivia, Bird Island, Hector, Buffalo Lake, Glencoe, Norwood, and Excelsior to Minneapolis.

Alluwe, Okla.-Southern Idaho

Alluwe, Okla.—Editor Motor Age—I am planning a trip to the southern part of Idaho, via Denver. At what time do the roads usually become blocked with snow and impassable?—M. Adamson.

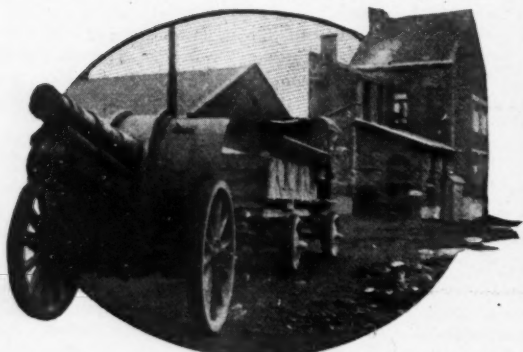
You are liable to encounter snow in the high altitudes at any time from now on; a storm may occur and then the weather clear up and the roads and weather be ideal for fall touring in the mountains. We cannot prophesy as to weather conditions a few weeks hence, other than that it is the time of year for snow, and particularly in the high altitudes. This is a chance you will have to take.

From Alluwe suggest that you drive to Arkansas City, then north through Wichita and McPherson to Salina, Kan. Here pick up the Golden Belt route and drive west on it through Russell, Wakeeney, and Oakley to Colby; then through Goodland, Stratton, Limon and Bennett to Denver via the Golden Belt, Kansas City-Denver Red Line and Rock Island highway, 625 miles.

Now you should go to Cheyenne, 109 miles, through Evans, Greeley and Dover; then west through Laramie, Rock River, Medicine Bow, Fort Steele, Rawlins, Wamsutter, Salt Wells, Rock Springs, Granger, Evanston, Peterson, Ogden, Bear River City, Malad and Pocatello, Ida., 612 miles.

War Brings Out Faults in Design of Motor Trucks

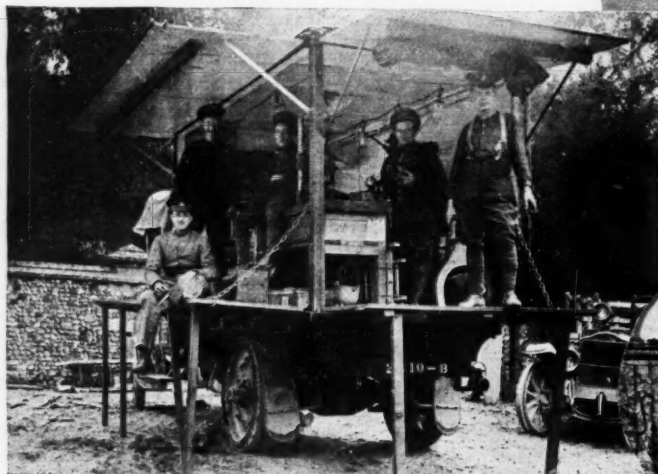
After One Year of Most Exacting Tests, Changes Have Been Incorporated in Vehicles to Increase Their Efficiency on Battlefields



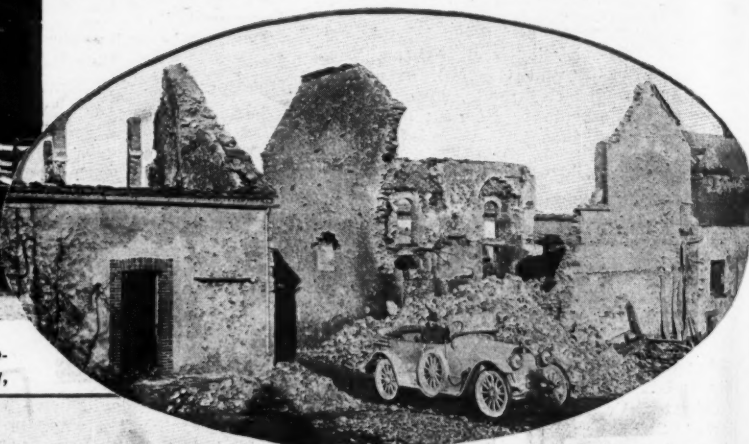
Jeffery quad taking a Krupp gun belonging to Belgians into action



French generals visiting trenches in the Argonne forest



One of the traveling mechanical workshops of Canadian supply column, being overhauled just prior to leaving Salisbury, England, for the front



Amid the ruins of Chatillon sur Morin



Pierce-Arrow 5-ton truck in use by Russian troops

LONDON, Sept. 10—In a recent visit made by an American truck representative with a military transport to the front in Flanders, an opportunity was afforded of observing the work of motor trucks in the war zone. Since the opening of the war many changes have been made which have increased the efficiency of the trucks. Chief in this regard is the putting men, who have had most experience on certain makes of trucks and keeping them driving these makes. It has also been found profitable to keep trucks of the same make as close together as possible in the same convoy, increasing the size of the convoys to do this. It has been found advisable to have a reserve wagon accompany convoys, this wagon equipped with the necessary spare parts and carrying skilled mechanics for the particular make of truck used in the convoy.

A frequent trouble with not a few Eng-

lish makes of trucks using force-feed lubrication, is that they have the pump in the bottom of the crankcase sump with outside oil pipes delivering the oil from the main bearing to the crankshaft. These external pumps are rapidly broken by vibration, which is immediately followed by loss of oil and in nearly every case burned out bearings. That such a failure as this might be disastrous in service at the front readily can be imagined, as situations arise in which every minute counts.

Not sufficient protection is given the ignition system to make it waterproof in several makes of trucks. Bad weather conditions have made many of the roads near the front veritable water bogs, the water splashing through the radiator and then being carried by the fan through the ignition terminals.

On many English makes the road clearance is not sufficient, with the result that the tie rod of the steering gear frequently strikes the ground and throws the wheels out of line. There are other makes which, because of the small clearance, really bury themselves in the mud, and some with large rear axles which catch the mud have not power enough to drag themselves out.

Some trucks are very much behind in the matter of lubricating the wheels, which in some cases is done by a large grease cup threaded into the outside of the hub. The same is true with universal

joints. It is the exception rather than the rule to see grease cups remain in; they all loosen, due to centrifugal force.

Trucks without water pumps are generally boiling all of the time. In fact, cooling is one of the most serious matters with many trucks. This is aggravated by the lack of attention given trucks by many drivers, and also by road conditions.

Another serious fault is that clutches are not sufficiently fool-proof and quite frequently have not a large enough factor of safety to take care of the overloading and poor driving to which the vehicles are subjected. In almost ninety-nine out of every 100 trucks observed, the drivers had their heavy military boot resting heavily on the clutch pedals, which meant early trouble.

inaccessible belt adjustment, does not help the cooling situation. Many makers are only beginning to realize that they must have better protection in front of the radiators.

Brake adjustments are very poor, being so frequently in inaccessible places or requiring some special kind of tool, which is invariably lost, to make the adjustment.

So often each particular maker has his own ideas as to what particular height the body should be from the ground that scarcely any two trucks can back up to the same load platform and unload or load heavy crates. In addition, in the same make of trucks there will often be half a dozen different designs of tailboards, and as these invariably get broken, there is needless trouble in replacing them.

There is a great scarcity of

rubber tires. Scarcely a week ago 150 American trucks of one make were being held in the crates at a French port waiting for tires.

The situation in England with reference to America is quite unusual. The sentiment against American trucks is strong, but it is a dog-in-the-manger attitude, because all of the British makers are booked up with the war department for 6 or 8 months, and as trucks are needed, there is no place to get them but America.

LOCOMOBILE LOSES SUIT

Philadelphia, Pa., Sept. 27—An opinion was filed in the United States district court here in the case of Joseph W. Parkin versus the Locomobile Co. of America, directing a decree in favor of the former. The bill of complaint alleges infringement of certain patents for improvements in



Mors armored motor car doing patrol duty on the roads of Belgium

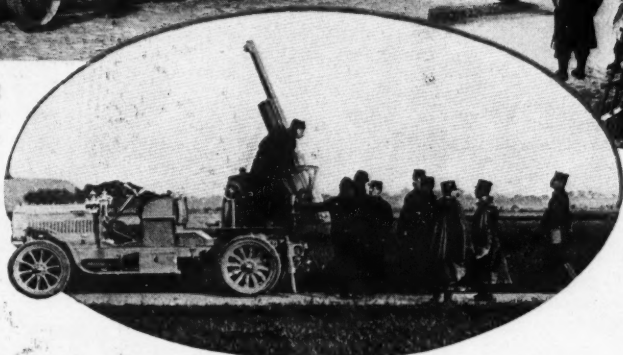


Armored car patrolling streets of Yarmouth, England, following aerial raid



British naval armored motor made in France to counteract the German armored cars

It seems as though the majority of designers have tried to show how heavy they could make the fan and how light or cheaply they could buy the belt. This, coupled with a very inefficient,



French gun mounted on motor chassis for firing against airships



Convoy of White trucks taking men to the trenches, stopped at one of the roadside ports. Note rough cab built by drivers as protection against storm

carbureters. The claims include the use of auxiliary air intake valves regulated by two springs successively coming into use to automatically.

New 16-Horsepower Delage a Racing Product

PARIS, Sept. 1—Racing experience has been very largely drawn on in the design and construction of the new six-cylinder, 16-horsepower Delage. The new model has been completed during the war period, and such arrangements have been made that as soon as hostilities come to a close the car will be manufactured in big series. At the present moment, Delage, like all other European motor car manufacturers, is so occupied with war material that it is impossible to produce big quantities of touring cars.

Work of Racing Experts

The car is the work of the engineers who have made all the Delage racing cars for the last 7 years. The object has been to embody all the lessons learned in contests with small, high-efficiency motors, and at the same time produce a car of simple design capable of being handled efficiently by the ordinary motorist.

The cylinders measure 2.9 by 5.9 inches, giving a piston displacement of 244 cubic inches. At 1,800 revolutions, the horsepower is 48; at 2,100 revolutions, 55 horse-

French Car of Six Cylinders Embodies Lessons of Speed Contests

power is obtained. With a total weight of 4,100 pounds, a load equivalent to an ordinary touring body and six passengers, the car has been tested to give an average of 68.9 miles an hour over the measured kilometre. The tests were made over a 3-mile stretch of ordinary road, the run being made in both directions and the average taken, thus eliminating any advantage which may have accrued from wind or gradient.

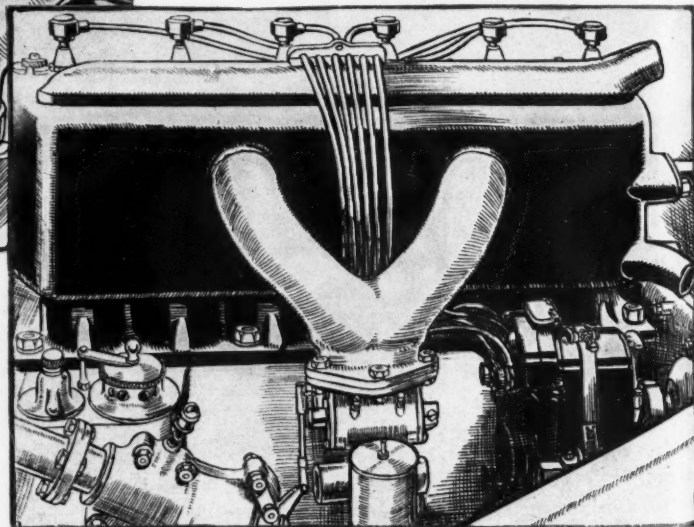
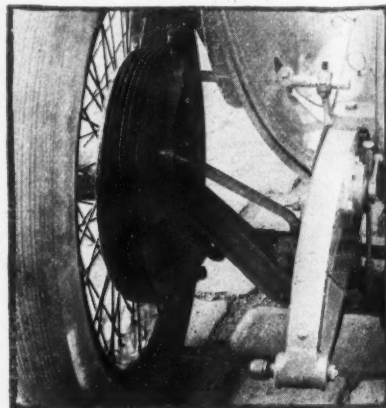
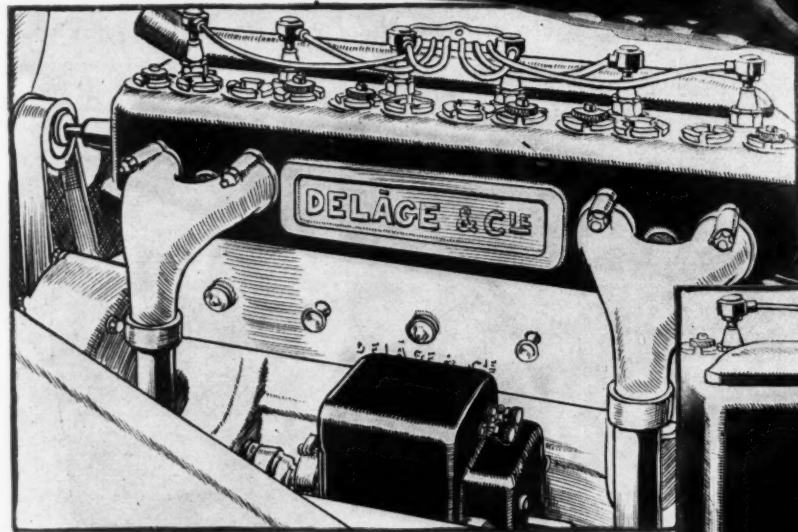
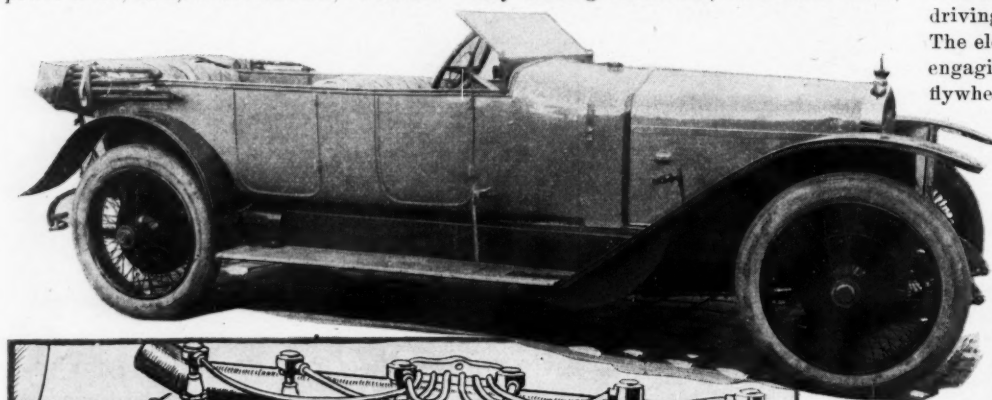
Fully equipped with touring body, spare wheel, windshield, fenders, headlights, top, and carrying five passengers, a test run of 140 miles was made at an average speed of 46.6 miles an hour. A similar test over more hilly country showed an average of 43 miles an hour over a distance of 125 miles. These tests were made under ordinary touring conditions, on French roads,

no allowance being made for examination of passes by military guards, grade crossings, or the passage through villages.

Externally, the motor follows standard design, being a monoblock casting with enclosed valves on one side. To get the best form of combustion chamber, the valve stems are inclined outwards, and the valve pocket is placed close up to the cylinder barrel. The crankshaft is carried in four plain bearings; pistons are steel forgings, unusually light, and fitted with two rings. Connecting rods are I-section, machined all over.

Electric Lighting and Starting

These cars are to be supplied complete with lighting and electric self-starting equipment. The electric generator is carried between the crankcase hangers, on left-hand side of motor, but sufficiently low not to interfere with accessibility of valve springs. The high-tension magneto and water pump are on the opposite side, the pump being ahead of the timing gear housing and the magneto to the rear of it. Non-adjustable silent chains are used for driving camshaft, magneto and generator. The electric motor is under the floor boards, engaging with an external gear cut on the flywheel. This arrangement of the cranking drive is the common one in American practice.



NEW 16-HORSEPOWER SIX-CYLINDER DELAGE

The illustrations show the sporty type of touring body and running gear and motor fittings. Note the front wheel brake with cooling flanges, the double exhaust manifold and electric generator

The arrangement of the exhaust manifold is somewhat unusual. There are four ports, to which two branched manifolds are bolted, the exhaust pipes having a straight drop just ahead of the crankcase hangers. Delage claims to have overcome usual carburetor difficulties inherent to six-cylinder motors by the use of a double carburetor, as developed on racing models. The car is certainly remarkable for its rapid acceleration. The duplex carburetor is a Claudel production, uniting two carburetors with a common float chamber. The two tubes and jets are side by side, although independent, and have a common throttle. A Y-shaped intake manifold connects up the two portions of the carburetor with the two ports on right-hand side of motor, the gas passages being surrounded by the circulating water. This model marks Delage's conversion from thermo-syphon to pump, so far as stock cars are concerned. Thermo-syphon, however, had never been used on Delage racers. Lubrication is pressure throughout, including direct feed up the connecting rod to the wrist pin.

Gearset is Separate

In designing this new model, Delage has decided against unit construction of motor and gearbox. He admits its apparent simplicity, but objects to its lack of balance, the weight being thrown too far forward except when a closed body or full load of passengers are carried. Motor and gearbox are thus separate, and carried on a sub-frame.

Leather-faced cone clutch has been abandoned in favor of plate clutch lined with Ferrodo. Gearbox is of same design as on racing cars, shafts being short and hollow and ball bearings throughout. In final drive, the only difference between this model and the racing cars is that the differential housing is cast-steel, instead of aluminum. The bevel-driving pinion is supported in ball bearings in front and rear, and the drive shafts are hollow. Drive is taken through the rear springs, which have a width of 2.5 inches and a length of 52 inches. In the racing models, rear springs are semi-elliptic; on the touring cars, they are five-eighths elliptic; in each case they are underslung.

Another innovation for which racing is responsible is the use of front wheel brakes. They are of exactly the same design as those used on last year's grand prix racing models, when the hilly and winding nature of the course made braking an important factor. Brake drums are ribbed to assist cooling and are machined all over; shoes are aluminum lined with Ferrodo. The pedal operates the road wheel brakes and the lever acts on the brake to rear of gearbox. Delage engineers are so satisfied with front wheel brakes, even in the hands of ordinary users, that it is possible the differential brake will be abolished. At present its only use is to hold the car when left on a gradient.

An aluminum dashboard is fitted, with the gasoline tank bolted within it. This

design makes the tank independent of any portion of the bodywork and facilitates the work of the coachbuilder. This model will be produced in three chassis lengths: ordinary for full touring car; extra long

for closed bodies, and short for sporting type, this latter being sold with a guarantee of 65 miles an hour, but declared to be capable of much more when greater speed is desired.

New Sheldon Worm-Gear Axle

Design for Trucks of 5-Ton Capacity Has Wheel Puller Attachment

A NEW worm-gear for trucks of 5-ton capacity has been brought out by the Sheldon Axle & Spring Co., under the model number W-50. After putting this new model through tests for several months, it now is ready for delivery. The new worm axle has been designed and tested for a tire load of 18,000 pounds, including the weight of the chassis, body and pay-load.

A feature of Sheldon axle practice which is carried out in the new design is the use of ball-bearings to take both the radial and thrust loads in the worm-gear carrier. The thrust is taken by a self-contained double-acting thrust bearing and the radial load is taken by two single-row annulars. The differential is mounted on single-row annular bearings, while the side thrust, differential and axle shaft are taken by separate thrust bearings.

Sheldon practice has also been followed in the construction of the brakes. As in all other Sheldon worm gears, this is done at the rear wheel rather than on the propeller shaft, as the driving strain is taken through the springs, thereby eliminating strut rods and torsion tubes.

Steel against bronze, both metals being of the Sheldon private formulae, are used for the worm and wheel. This part of the axle receives the most minute inspection as regards accuracy. Every individual worm and wheel being tested in a precision measuring machine to 0.0001 inch for accuracy. These tests are made so complete that interchangeability of all worms and wheels is assured.

This model also is provided with a wheel puller attachment. The operation of demounting a wheel from this 5-ton axle consists simply in removing the hub cap, taking off the wheel retaining nut, replacing the hub cap, and giving a few turns to the wheel-removing stud which accompanies the axle. The axle ends are so designed that when the wheel has been

removed, the bearings remain undisturbed and protected in their housing upon the axle shaft. Tierods and ribs are eliminated in Sheldon construction, this concern maintaining that from experience they are satisfied that if the tie rod is tight enough to perform any function it tends to buckle the axle and if it is loose enough so as not to endanger buckling, it lets the axle down.

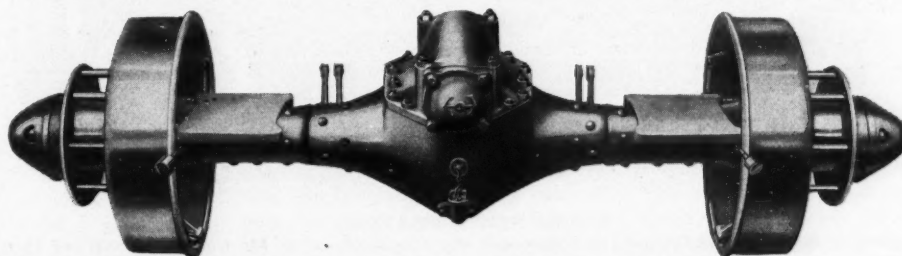
The worm gearing and the differential are mounted on a complete unit designated as the worm carrier. The entire working unit is not only mounted in a unit, but it is so constructed as to be free from adjustment of these parts, such as would make it unsafe to have one of these worm gears dismantled in any first-class garage and reassembled.

NEW PERFECTION TIRE ANNOUNCED

Fort Madison, Ia., Sept. 28—A new tire, guaranteed to be heat-and-water proof and to give satisfactory service for 7,000 miles without punctures or blowouts, will shortly be placed on the market by the Perfection Tire and Rubber Co., Fort Madison, which is now erecting two plants. The first unit will be entirely completed, with machinery installed, by October 15. The second will be ready for occupancy not later than December 1. The initial output will be 1,000 tires a day, commencing December 1. These tires will be manufactured under the Evans patents, which combines the use of asbestos and rubber. The Perfection Tire Sales Co., which will have its main office in Buffalo, N. Y., will take care of the sales end of the business.

MOSLER ANSWERS CHAMPION

New York, Sept. 27—A. R. Mosler & Co., New York, has entered its answer in the infringement suit started last month in the United States district court for the southern district of New York by the Champion Spark Plug Co. The suit was



New worm-driven axle produced by the Sheldon company for trucks

based upon alleged advertisements by Mosler and other spark plug manufacturers of their plugs as Ford plugs, when the Champion company, according to its claim, has secured the entire factory supply orders from the Ford Motor Co., for spark plugs.

Usual disclaimers as to knowledge of whether or not the Champion company is supplying plugs to Ford, and so on, are made, also that the design of the Champion plug was originated by the Champion company or is distinctive in appearance, design and construction from other plugs used by the Ford Motor Co. and that the plaintiff's plugs have been exclusive Ford factory equipment.

MAXWELL BUSINESS INCREASES

New York, Sept. 24—At the end of the fiscal year, July 31, 1915, the Maxwell Motor Co.'s net earnings were \$2,303,314. As compared with the net earnings of 1914, this is an increase of \$797,847, or over 50 per cent more than the 1914 surplus balance.

These net earnings or surplus are equal to 18.7 per cent of the first preferred stock, which amounts to \$12,279,332 and would permit a distribution of 7 per cent on this stock, 6 per cent on the \$10,127,468 second preferred and 6.50 per cent on the \$12,778,057 second preferred stock.

The cash on hand, July 31, of this year, was \$2,652,629, or \$866,637 more than on July 31, 1914.

STUDEBAKER HAS 76,000 ORDERS

Detroit, Mich., Sept. 28—The Studebaker Corp. now has over 70,000 domestic orders scheduled for 1916 cars, and more than 6,000 orders for shipment to foreign countries, including Canada, Great Britain, Australia, India, China, Philippines, South Africa, South America, Cuba, Porto Rico, Central America and continental Europe.

REMINGTON BUYS VAUGHAN PLANT

Kingston, N. Y., Sept. 27—The Remington Motor Co. has bought the plant formerly occupied by the Vaughan Motor Car Co., in Kingston. This plant has been idle for 2 years.

Uniform Announcement Favored by Dealers' Association in Kansas City

Want New Model Specifications Made Public in January

KANSAS CITY, Mo., Sept. 28—The Kansas City Motor Car Dealers' Association has put itself on record as favorable to an announcement of new models for the forthcoming year on January 1 by all motor car manufacturers. A resolution to that effect was adopted by the association at its most recent meeting without opposition. The consensus of opinion was that the present plan of making these announcements at uncertain and irregular dates causes confusion and the change proposed is in line with the sentiment of dealers throughout this part of the country. The association fixed the date of the next motor car show for February 7, 1916.

TO DECIDE ANNOUNCEMENT TIME

New York, Sept. 25—The committee of the National Automobile Chamber of Commerce, Inc., on a uniform time for announcing new models, will probably meet in Detroit either on Tuesday, Sept. 28, or Wednesday, Sept. 29. The committee has collected a large amount of data from manufacturers and dealers and it is said that its verdict will be in favor of an-

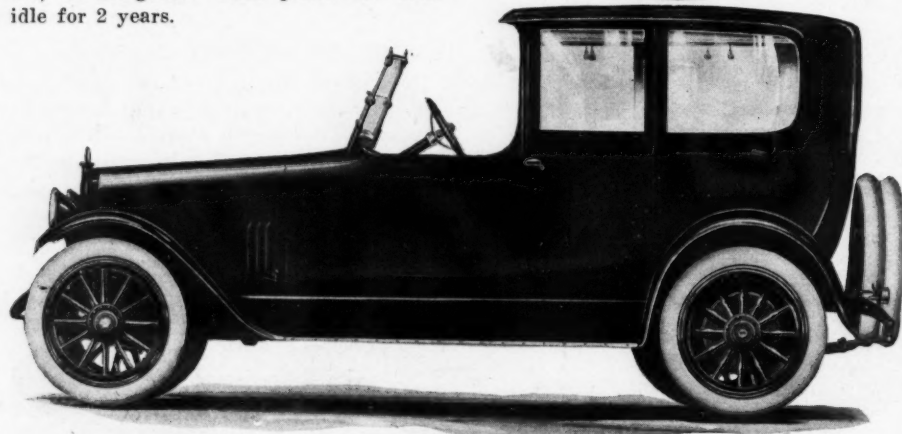
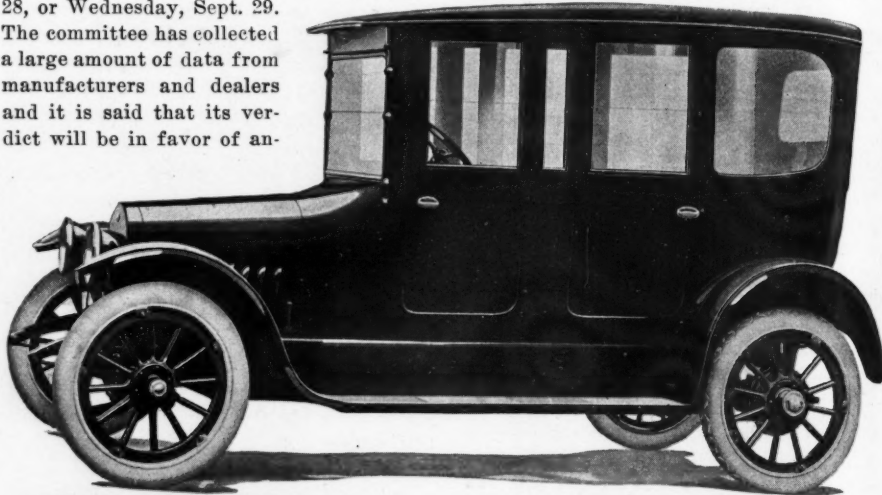
nouncing new models some time after September, in order not to disrupt the selling season. The committee, of which Hugh Chalmers is chairman, consists of C. W. Nash, Buick; Alvin Macauley, Packard; A. L. Riker, Locomobile; John N. Willys, Willys-Overland; C. C. Hauch, Studebaker, and W. C. Leland, Cadillac.

SPLITDORF BUYS DIXIE PATENTS

Newark, N. J., Sept. 25—A million dollars for basic patents of the Dixie magneto was paid last week by the Splitdorf Electrical Co., of Newark, N. J., to the Sumter Electrical Co. of Sumter, S. C., which controlled them through the invention of its president, Charles T. Mason. The Splitdorf company will continue to manufacture the line of Sumter magnetos for the stationary engine, marine and tractor field, at Sumter, S. C., but will manufacture and sell the motor car, motorcycle and aeroplane Dixie models exclusively at its plant at Newark, N. J.

REGALS HAVE DETACHABLE TOP

Detroit, Mich., Sept. 24—Detachable sedan tops for winter use are offered for each of the three 1916 Regal models. The small four touring is shown in the reproduction and the same top is supplied for the eight and standard four touring car. The new top takes the place of the stand-



TWO NEW BODY TYPES

Above is shown the new Regal small four with the detachable sedan top which is announced this week. Below is the new Mercer town car on the 22-72 chassis

ard touring top at a small additional cost. The standard top, which is also furnished, can be conveniently and quickly replaced.

This top has been designed and fitted to be weather and rainproof. It is locked securely to the touring body, so that it eliminates rattle. It is finished in harmony with the rest of the body and is electrically lighted.

GOODYEAR TO HIRE 1,000 MEN

Akron, O., Sept. 28—The Goodyear Tire and Rubber Co., this city, has started a house-to-house canvas to find rooms for 1,000 men that the company will bring here within the next 2 weeks. Four new buildings, an addition to the plant, will be put in operation as soon as the company can find men to work in them.



The Motor Car Repair Shop



Battery Care for the Approaching Cold Season

ALTHOUGH much is said from time to time in the columns of Motor Age regarding the electric lighting and cranking system of the modern motor car, nevertheless there is so much that the non-technical owner should know about it that it seems but fitting to devote our attention this week to some special points not usually taken account of in the instruction books published by the factories.

As the storage battery is the one unit that is most likely to get out of order through carelessness or ignorance on the part of the car owner, let us chiefly consider it. The instruction books are all very emphatic in their directions as to keeping the plates of the battery properly submerged by adding pure water from time to time as it evaporates, but they nearly all fail to state that it is detrimental to add acid to the battery solution except to replace any that may be spilled.

The water evaporates, but the acid does not, so if more acid is added when the solution is low, simply due to evaporation, it is apparent at once that the proportion of water to acid is being changed in favor of the acid. This, of course, should not be.

When New Acid Is Needed

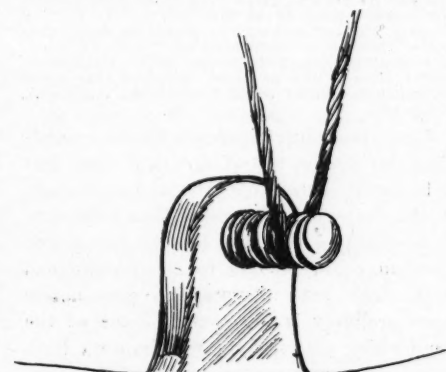
If the conditions under which the solution level is low are clearly the result of spilling, or of a broken jar, and you know that acid mixture is needed instead of water alone, then this can be prepared by simply mixing water and chemically pure sulphuric acid in the proportions of two parts acid to five parts water by volume. That is, for the average size of battery, there should be measured out 5 quarts of water, this being put in an earthenware vessel or other receptacle which would not be attacked by the strong acid. Then to this pure water, 2 quarts of sulphuric acid should be very slowly added, stirring the mixture well as the mixing process is carried on. Special note should be taken of the fact that the acid should be poured into the water, and not the water into the acid. This is because there would be excessive evaporation of the water due to overheating it, should the water be poured into the acid.

A mixture in these proportions will, strangely, give only about 6½ quarts of electrolyte, on the average, although you would expect 7 quarts of solution. The discrepancy is in the evaporation of the water, and the extent of it depends largely on the rate at which the two were mixed. As the specific gravity of chemically pure sulphuric acid is about 1.840, and that of water is 1.000, the gravity of the resulting mixture should be in the neighborhood of

1.300, when the solution of acid in water has become cool.

Corrosion is an enemy of the storage battery. If the terminals show any signs of it, the matter should be removed from them as soon as possible before the lead parts are eaten away. The best way to clean the terminals and connections is to take off all the parts, such as bolts, nuts, straps, etc., that can be removed without damaging the battery, and then to immerse them in a solution of soda and water. Use a good proportion of soda, so that there will be plenty of action, and allow the pieces to stand in the solution for about 1 hour. After that they should be cleaned with a stiff brush until there are no signs of the corrosion.

It is rather unusual, but petroleum jelly is now useful in this connection. Having cleaned the terminals to your satisfaction



QUICK WAY OF CLEANING BATTERY TERMINALS

A cord drawn rapidly around the lugs will clean off the terminals if they are not deeply incrustated

—not only thoroughly brushing the parts that you can take off, but brushing the lead terminal ends and connectors that cannot be removed from the battery as well—rub this petroleum jelly over the terminal pieces thoroughly after having dried them of the soda solution. Then reassemble them on the battery, and use some more of the jelly to smear onto the parts you were not able to take off.

Oftentimes a crack will develop in the composition material that is found on the top of the battery. This is a tar compound, having somewhat the properties of sealing wax. The cracks often develop into serious places of leakage and they should be sealed together whenever they develop. To do this, the simplest way is to heat either an old chisel or putty knife or similar tool until it is hot enough to melt the tar compound. Then press it onto the latter on the edges of the crack and by working the melted substance, the

crack can usually be sealed over. Sometimes, however, the crack or hole is of such size that it cannot be sealed in this way, due to insufficient tar material. It is best to buy a lump of it, in that case, from a battery service station. Send to the one nearest your town, and you will be able to secure a lump large enough for several batteries for about 5 cents.

In a storage battery of the 6-volt type there are three cells. Each of these cells has a voltage of about 2.2 when fully charged, and there will be some drop in the voltage as the state of charge diminishes. Many owners have a mistaken idea that a voltmeter reading is a true indication of the state of charge of the battery. This is not correct, for although the voltage will drop, it is not a true indication by any means. The only sure way to tell is by the hydrometer, the reading of which should be in the neighborhood of 1.275 to 1.300 when the battery is fully charged, and when completely discharged, the gravity reading should not be very far from 1.150.

Using a Hydrometer

In using a hydrometer, you should be very sure that you have one which reads correctly, and that is made by a responsible firm. There are many so-called hydrometers on the market, which are really only makeshifts so far as their accuracy is concerned. In fact, experienced battery men say that the hydrometers often vary as much as 100 points in their readings. Obviously, an instrument which is that far off the standard is apt to give very false impressions, with the result that when a battery is fully charged, the hydrometer will deceive the owner into thinking that it is almost discharged.

Unless one knows pretty well what he is about, he is advised to let alone the matter of battery charging from outside sources. In the first place, only direct current can be employed, and then the rate at which a battery is charged depends upon the capacity of the battery and also upon the state of charge. The first thing to do is to determine which of the charging wires is positive, and which negative, for they must be connected to the corresponding terminals of the battery.

To find out which is which, it is often found expedient to immerse the wire ends in a salt solution when the current is on. When held a short distance apart, bubbles will come from the negative wire. If you are not sure whether the current is alternating or direct, the salt solution test will also tell you. If the current is alternating, gassing or bubbling will come from both wires.



The Readers' Clearing House



Incompetent Repairmen Reader Recites an Expensive Experience

Woes of Motorist at Hands of Country Garage

CHICAGO, Ill.—Editor Motor Age: Page 11 of Motor Age, issue of September 23, certainly does touch a subject of interest to me. Won't you follow that up and push a crusade against the countless willfully careless and ignorant garage repairmen who ruin many cars yearly, as well as kill the pleasure in motoring.

I just want to cite a personal experience with them. I have used a car in the southern end of this state for several years. Our nearest city is St. Louis, 140 miles, and you have to go there for A-1 service. As that is usually impossible, we are at the mercy of the local garage. If we don't cater to them and suddenly need to call on them for help, they will refuse and say, "Why, go to St. Louis," or some place else, and there you are.

Three years ago we broke an axle shaft out 15 miles in the country. The garage sent out two men who removed the semi-floating shaft and took it to town, where a new one was made, taken out and installed. They assured us the one they made was O. K., but before we had gone 100 miles the driving pinion and axle bearings were ruined, due to bad fit and bad alignment.

First repairs, including 2 trips out to car, \$29.

Second repairs, due to their service, \$58.

The next spring they set up connecting rod bearings, then tested the car out at about 40 miles an hour, burning them out completely; repairs, \$21. That fall they verbally agreed to overhaul motor for \$30, we to buy new wrist pins and bushings. The car was turned over to me the next spring to try out.

It took 4 days to start the motor, which knocked five times worse than it had before, even shaking the car when idling. The motor was torn down again. I found pistons and connecting rods put in wrong cylinders as well as turned at 180 degrees, preventing oiling of connecting rod bearings. Assembled, and no better. Torn down again; still not fixed.

At last I found the center crankshaft bearing $\frac{1}{4}$ -inch too high, which was the trouble. The bill was \$114. In their repairing they took the carburetor to pieces to see how it worked, and ever since it flooded. They worked on it again and

pronounced it O. K. Then it just flooded most of the time till once it let 14 gallons of gasoline drain out over a night and in cranking in the dark, it back-fired, caught fire and was ruined. New carburetor and repairs, \$60.

The machine is a business proposition and must be in shape to go all the time. We can't wait 3 or 4 days to get a man from St. Louis every time there is 2 or 3 hours of work needed on it.

Can't you come to the aid of people persecuted as we are and prevent the utter ruin of parts of and sometimes complete motors, beside the robbery of owners of hundreds of dollars?—L. M. C.

COMPRESSION LOSS NOT ANTI-SKIDS

Lack of Power May be Remedied by New Piston Rings

Marshfield, Wis.—Editor Motor Age—I have a Michigan 1913 model equipped with four nobly tread tires, one on each wheel. While the car in general gives very good satisfaction, the power seems to be insufficient. Is there a greatly heavier pull on the motor in using four nobly tread tires than four smooth-tread tires? The compression of the motor seems to be weak and I should like to know whether this could be improved on by using new piston rings.—A. Newmann.

There is a slight increase in road resistance due to the use of non-skid tires, but it is hardly noticeable, and the advantage of the better traction more than offsets it. It is doubtful that the loss of power you mention could be due to the rough-tread tires. The poor compression you notice more probably is the cause. Some of the non-leaking piston rings will improve both compression and power, provided the compression loss is due to leakage past the pistons, and the cylinders are not badly scored.

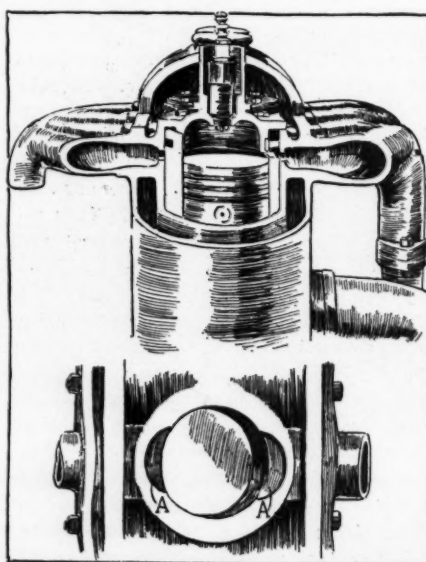


Fig. 1—Sectional views of Magic motor showing operation of one type of non-poppet valve

Steering Gear Again Four-Wheel Drive Idea of Novel Type

Suggestion Designed to Give Better Road Work

NEVADA, Mo.—Editor Motor Age—I have read with interest the letter from Mr. M. J. Napier in the Readers' Clearing House of the issue for September 9. I agree with Mr. Napier that it is not only hard on the cars but hard on the roads to have a car making, and suffering in, crooked ruts. A few years ago I was thinking about this problem a good deal and decided then from what experience I had had with standard steering gears that the whole method of steering the car was wrong. The manner in which I solved the difficulty theoretically at that time might prove of interest to your readers and I still believe that it would be worth a trial.

In order to make a car go straight, I would replace the front axle with another rear axle, made just as the ordinary rear axle, except that I would make some change in the differential and arrange that a brake band be applied to the driving member of the differential for each wheel. These brake bands I would gear to the steering post in such manner that when the wheel is turned to one side it would tighten the band on the same side, causing the wheels on that side to go slower and the wheels on the opposite side to go proportionately faster, causing the car to turn.

It would even be possible to place in each side of the differential case, a planetary reverse gear, which would become operative when the brake bands on either side were tightened up sufficiently to stop the revolutions of the drum, making it possible to back the wheels on the one side, while the wheels on the opposite side were driving forward at an increased rate. With such an arrangement we would not only overcome any tendency of the car to jump from side to side, to climb the side of ruts and bounce aside when meeting obstructions, but we would also have a four-wheel drive which would make our machine capable of negotiating any kind of sand pocket or mudhole through which the wheel could be rolled. We would have a better hill climber; we would get rid of the tendency to skid and I think we would have a car which would turn in shorter space than any now made. Of course, there are some objections to this method of construction, in that we would have

more wearing parts, but that objection, I think, is not serious in consideration of the advantages and in view of the fact that all of these extra wearing parts are increased and run in oil.

Before closing, I wish to say just a word about the preservation of roads. Driving straight will help wonderfully but, even more important than that as a means of preserving the road surfaces, drivers should not follow each other's tracks if there is any tendency for this to increase the depth of ruts. This is not so important on rock roads, but on dirt roads it is very important and especially for narrow-wheeled, horse-drawn vehicles. If every driver would make a practice of avoiding the preceding driver's ruts, it would be impossible for deep ruts to form even in dirt roads.—Ernest Weltmer.

NON-POPPET VALVE MOTOR TYPES Knight Sliding-Sleeve, Mead and Magic Operation Described

Horton, Mich.—Editor Motor Age—Kindly describe the different types of valve action other than the common poppet valve; such as the Knight motor.—Charles M. Eddy.

Besides the Knight sleeve-valve type of motor, there are two others that might be mentioned in this connection. They are the Mead rotary-valve engine, which the Speedwell company used, and the Fischer sliding-valve type. There are, of course, many other forms in which a non-poppet engine could be constructed, but these three are all so distinctive in design that they will serve to give you a good idea of the development along the non-poppet line.

The Knight engine is more or less familiar to the public, having been completely described on numerous occasions in Motor Age. The latest description of the Knight engine appeared in the issue of July 15, on the occasion of the announcement of the new Willys-Knight car.

Referring to the diagrams in Fig. 2, the various stages in the cycle of the Knight engine are shown diagrammatically. This type of motor may best be described as a

Questions Answered and Communications Received

L. M. C.....Chicago, Ill.
A. Newmann.....Marshfield, Wis.
Ernest Weltmer.....Nevada, Mo.
Charles M. Eddy.....Horton, Mich.
Tenderfoot.....Denver, Colo.
M. N. Lenning.....Lawson, Sask., Can.
A. Reader.....St. Louis, Mo.
Gerald Haschke.....Dayton, O.
Subscriber.....Akron, O.
E. D.....Storm Lake, Ia.
A. A. Hawn.....Chickasha, Okla.
Owner Driver.....Lake George, N. Y.
R. J. Stoddard.....Reehouse, Tex.
H. F. Seammon.....Kansas City, Kan.

No communications not signed with the reader's full name and address will be answered.

construction in which there are two cylindrical sliding sleeves placed between the piston and the cylinder walls. These sleeves have a certain relation in their reciprocating motion to that of the piston and also to one another. Near the top of each sleeve there are rectangular ports extending part way around the circumference of the sleeve and on opposite sides. In the sides of the cylinder there are corresponding slots, one communicating with the exhaust manifold and the other with the intake.

When, in the slow up and down movement of the sleeves, the slots on the exhaust side of the engine register with the exhaust slot in the side of the cylinder wall, there is a clear passage from the cylinder to the manifold, just as when the poppet valve is open to emit the exhaust gases. Thus it takes the registering of all three slots to make a valve opening. Refer to the diagram to make this clear. The sleeves are moved up and down by connecting rods, which are actuated from an eccentric shaft.

In the Mead motor, rotary valves take the place of the sleeves. The cylinders are just the same as in a poppet motor, except that at the top on either side, there is a slotted shaft. When, in rotating, the slot registers with the ports in the cylinder walls, the gases enter or leave as the case may be. In the Speedwell application of

this motor, the shafts were rotated by silent chains connecting with the crankshaft. Now looking at Fig. 3, the operation of these shafts is shown.

In the Fischer motor, or Magic motor, as it is called in this country, the valves are of sliding form, but they do not go all the way around the piston, as in the Knight motor. Instead, the sleeves are crescent-shaped, and the exhausts on one side and intakes on the other. Two eccentric shafts move them up and down, and register slots in their upper ends with openings in the cylinder wall. The construction may be seen from Fig. 1, which is a section through the end of the engine.

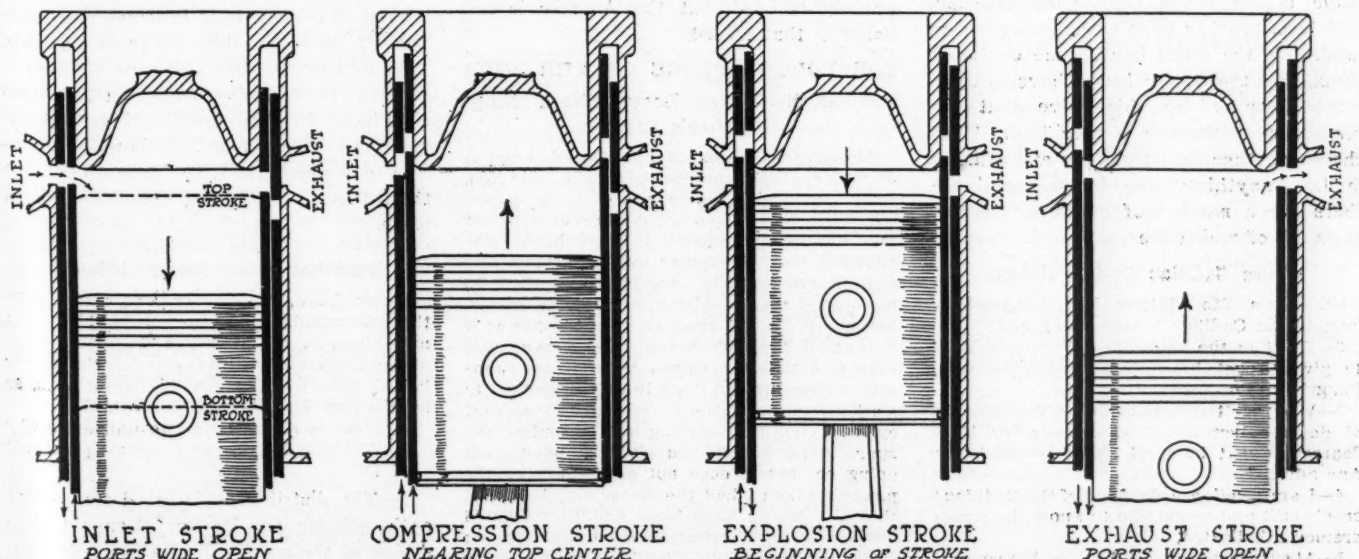
WANTS TO INSTALL NEW ENGINE Not Feasible to Apply Continental Engine to Ford Car

Denver, Colo.—Editor Motor Age—Would it be possible and feasible to put a 3½x5 or a 3¼x5½ Continental engine in a 1913 Ford touring car without increasing the wheelbase, and if so could the Ford radiator or one of equal width be used? I am willing to sacrifice a few inches of foot room in preference to increasing the wheelbase.

2—The proportion of horsepower to total car weight seems to be not over 1 horsepower to every 75 pounds of weight in the average four-cylinder touring car. Is there any block four-cylinder touring model made with the proportions 1 to 50 or 1 to 55 or anywhere near it? For instance a 35-horsepower engine (S. A. E. rating) in a 1,500 or 1,900-pound car. Is there any mechanical obstacle that precludes this proportion of power to weight?

I sold a heavy car 3 years ago to buy a Ford (size rather than price being the inducement) and am a small-car enthusiast, especially when touring on narrow, winding mountain roads, but sometimes the outfit carried is pretty heavy. A racing car is not what I have in mind in the above questions, but a small car bearing the added weight of electric starter and batteries that can take three or four passengers and some baggage, with two extra tires instead of one (on demountable rims) and still not feel the weight materially on hills. A speed of more than 22 M. P. H. on the level will not be indulged in, so if the heavy engine racks the car or vice versa, it will not be because of fast going.—Tenderfoot.

1—This could not be done, as the Ford



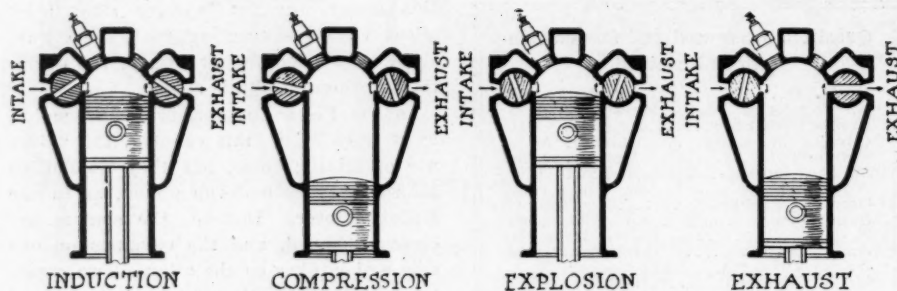


Fig. 3—How the Mead rotary-valve motor operated

planetary transmission system could not be applied to these engines. With them you would need a sliding gearset, and that would be practically impossible to install, as it would mean changing the control, etc.

2—Motor Age knows of no such stock cars made in this country. There is nothing against such design except that you would waste power. The nearest approach to what you are after might be a Scripps-Booth, a small Buick six, a Saxon, Grant, Oakland, Briscoe, Oldsmobile, Overland, Reo, Hudson, Chandler, Dodge, etc., etc.

HOTCHKISS DRIVE ARGUMENT UP Use of Torque Arms and Tube Question of Designer's Opinion

Lawson, Sask., Can.—Editor Motor Age—Would you please tell me how some cars have radius rods in the rear with live axles and others have not, yet they say that cars without radius rods are driven through the springs and called the Hotchkiss drive. Does the housing over or around the drive shaft act as one as shown on Fiat and other cars with large and strong ones?—M. N. Lenning.

In cars using the Hotchkiss drive, the rear springs are designed to take the drive and the torque. Their main leaves, called the master leaves, are made strong enough for the purpose. This type of drive is usually considered adaptable to cars of moderately light weight, however.

The fact that some cars have radius rods and torsion arms shows that there is a difference of opinion among engineers as to which drive is most advantageous. There is no doubt that the Hotchkiss drive makes for a lighter construction, and it is proving very satisfactory where used. On the other hand, some engineers argue that the master leaves have to be so much stronger for this drive that the resiliency of the car is sacrificed. Then there are other arguments pro and con. It is like anything else in engineering—there are a number of possible constructions, all of which are very good.

Wants Cadillac Design Details

St. Louis, Mo.—Editor Motor Age—How long is the Cadillac 8 connecting rod?

2—What is the address that I would have to give to get information from the Lion Peugeot automobile?

3—Why can't a four-cylinder V engine be 60 degrees instead of 90 degrees, or if 60 degrees cannot be used, what would Motor Age advise?

4—I am sending a drawing of the Cadillac 8 crankshaft and would like to know the measurements indicated.

5—About what would be the horsepower and r. p. m. of a four-cylinder engine that

has a 213.6 cubic inch piston displacement?—A Reader.

1—Information not available.

2—Peugeot Auto Import Co., New York.

3—Because, in this kind of a four, you would have to divide the 360 degrees of a complete revolution into equal parts so as to bring the movements of the pistons into proper relation to one another. Your motor should be 90 degrees, although such a design is not a good mechanical proposition in any case. It will not balance.

4—Motor Age cannot give you this information.

5—That would depend upon the design of the engine, and on the bore and stroke. No two designs of motors of exactly the same bore and stroke will give the same horsepower. The r.p.m. can be arbitrarily fixed in accordance with the possibilities of the design.

AEROCAR DISCONTINUED IN 1908 Company Produced Machines Only 2 Years at Prices Ranging from \$1,500 to \$2,000

Dayton, O.—Editor Motor Age—Can you tell me when the Aerocar was first manufactured and when discontinued?

2—What were the prices of the Aerocar?

3—Were Hyatt roller bearings used in the Aerocar machines?—Gerald Haschke.

1—The first Aerocar was made in 1906—called a 1907 model—and these cars were discontinued in 1908.

2—The 1907 model sold for \$2,000 and the 1908 for \$1,500.

3—The maker of Hyatt roller bearings keeps a record of all cars on which its product is used, but the Aerocar is not listed in that record.

FOR FOULED PLUGS ON THE FORD Too Much Oil or Loose Piston Rings Probable Cause

Akron, O.—Editor Motor Age—I have a Ford car which I purchased new a year ago, have run about 10,000 miles, have driven carefully, and taken good care of the car mechanically as far as I know how. Recently I took the motor out of chassis and went over carefully; everything seemed to be in good shape. Also ground in the valves, but motor did not seem to have the power it should. I took it to the Ford garage and they said that the valves did not seat properly. They ground them in and it seemed to work better with the exception of the front cylinder. Oil kept coming up and fouling the spark plug, but it has since stopped from doing so, but it does not seem to have the power. When I had the motor out, I noticed that the drums were loose and that I could move them on the transmission shaft almost $\frac{1}{4}$ inch horizontally. Should this be? Since coming from the garage, I noticed that when

the motor is pulling or running at good speed, the front and rear cylinder has the best compression. How does Motor Age account for this? The motor smokes quite a lot. I keep plenty of oil in the crankcase, but not a surplus. Will Motor Age advise me how to get best results with Ford motor? Have checked up on carburetor and ignition and found them O. K.—Subscriber.

In the main, it would seem that you are using too much oil. In the oiling system of the Ford motor, the lubricant is led from the flywheel reservoir through a pipe to the front of the motor. From this point it works its way back to the reservoir through the oil troughs. If you are using too much oil, the first cylinder is apt to get the benefit of it more than the others, except the rear cylinder which is nearest the reservoir at the bottom of the flywheel. The engine is fitted with two pet cocks in the side of the flywheel housing. After draining the motor, put in 1 gallon of medium light cylinder oil—the best you can get.

The best way is to have the oil always in the reservoir at a level half way between the two pet cocks. Open the upper one, and if oil runs out of it you are using too much. But it should run out of the lower one at all times, indicating that the level is not up to the upper cock but is above the lower. After each 75 to 100 miles running inspect these try-cocks again.

If, when you are sure that you are using the right amount of oil, you find that the front and rear cylinders have the best compression then the trouble may be due to the fact that the piston rings are too loose allowing the compression to leak past them. Try the valve springs also. They may be weak, thus not closing the valves properly.

Regarding the looseness of the drums in the transmission, it does not do any harm if they have a slight end play, as the driving parts are keyed to their shafts. The clutch-disk drum is keyed and fastened to the transmission shaft by a set screw, and this should hold the drums in place. Unless you have some trouble with the transmission, however, it is best not to tamper with it, as it is a big job to disassemble. If at any future time you have occasion to take out the motor, you might at the same time take off the clutch spring, then remove the driving plate. This will give access to the disk drum, and you can see that the set screw is holding the disk drum in place.

Distribution of Intake Mixture

Storm Lake, Ia.—Editor Motor Age—Will the end cylinder in a six-cylinder block-cast motor receive as much gas from carburetor where same has no intake and carburetor is bolted right to block, as the center ones, as on the new Madison 1916 six-cylinder?

2—What is meant by a two-unit system?

3—Which is considered the most practical?—E. D.

1—The distribution is cared for so that each cylinder gets its correct supply. The design of the manifold, in a correctly built engine, is such that the passages to the

cylinders closest to the carbureter are somewhat more restricted than those for the more remote cylinders. This has the effect of compensating for the difference in distance.

2—A two-unit system is one which incorporates separate electric starting motor and generator, in contrast to the systems making use of a combined motor-generator.

3—Both have been worked out to give satisfactory service. There is scarcely any difference in their practicality.

TIGHTENING KRIT STARTER CHAIN Simple Provision for Taking Out Slack in Starter Drive

Chickasha, Okla.—Editor Motor Age—Is there any way to take up slack in chain to electric starter on a Krit car model M 1915?—A. A. Hawn.

There is a very simple provision on this Krit model for tightening the chain of the electric motor-generator. On the left side of the engine you will find a housing which incloses the sprocket which is in direct connection with the shaft running back from the electric unit. It will be noticed that there are two parts to this housing. The front part is simply bolted to the rear part, which rear part is integrally-cast with the flywheel housing. This front part of the housing carries the sprocket bearing which is off center enough to take care of the adjustment. Take out the bolts which hold the two parts of the housing together, and then turn the whole front part one or two bolt holes to the left, when looking at the engine from the rear, or to the right when looking from the front of the engine. Do not get the chain too tight, or it might become noisy and wear unduly. If two bolt holes makes it too tight, turn the housing only one hole. Then replace the bolts and tighten. The adjustment is very easily made, since the housing is easy to reach.

HANDY BAGGAGE COMPARTMENT Neat Touring Equipment in Form of Running Board Trunk

Lake George, N. Y.—Editor Motor Age—One-half a motor tour consists in having a good method of carrying the baggage without interfering with the comforts of the passengers, and one of the best equipments I have seen this year passed through here this week. The two illustrations herewith show how four suitcases are carried on the right running board. The baggage compartment for trunk is covered with waterproof with snap fasteners, making it impossible for water or dust to enter. One illustration shows how the four suitcases are placed in the compartment, two lying on their sides in the bottom and two larger ones standing upright on the top. Over the larger two is a felt slip which prevents rubbing.

The entire baggage system is attached by boring two small holes in the running board and attaching the baggage trunk by two vertical rods, one of which is shown

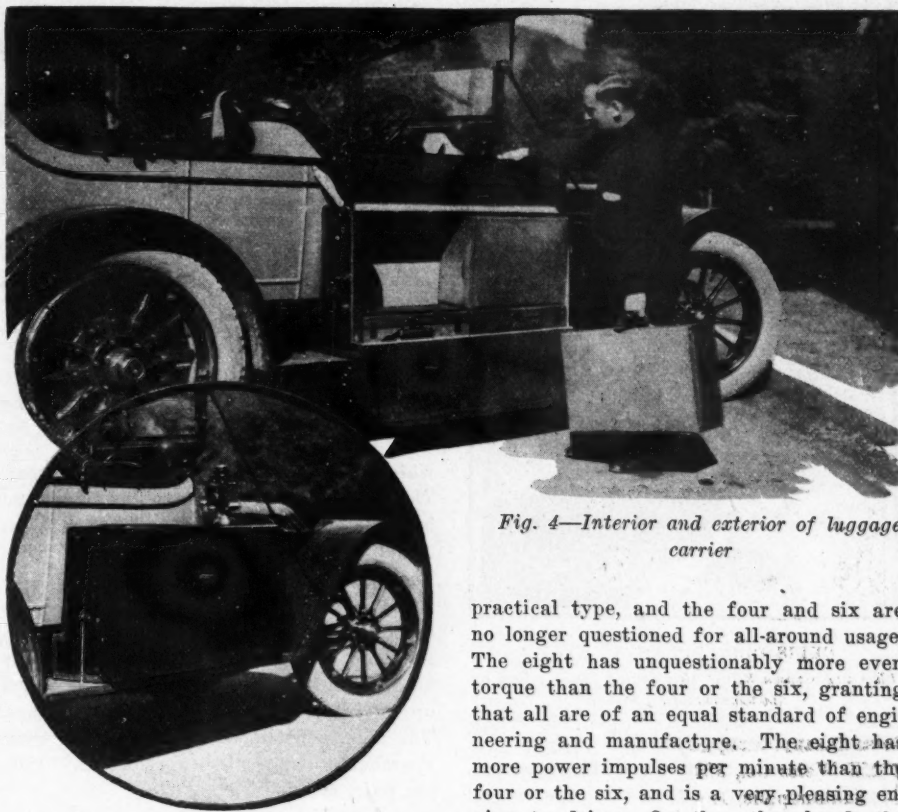


Fig. 4—Interior and exterior of luggage carrier

at the end, the other occupying a similar position at the front end. The rack can be attached or removed in two minutes. Carrying all of the baggage in this position allows of carrying two spare tires at the rear and leaves the tonneau of a five-passenger car entirely free for passengers and any loose clothing such as coats, wraps, etc.—Owner Driver.

FOUR, SIX AND EIGHT ADVANTAGES Comparison of Motors of Different Members of Cylinders

Beehouse, Tex.—Editor Motor Age—Will Motor Age state the relative advantages and disadvantages of a four, six and eight-cylinder motor car for popular use?—R. J. Stoddard.

A discussion of the relative advantages of the three types of engines you mention involves so many conditions that it would be difficult for Motor Age to give you much light. You evidently are thinking of buying a popular-priced car, and are wondering which is the best for you, since it is now possible for you to get either type at a figure around \$1,000. If this is the case, the best advice to give you is to buy whichever one meets with your requirements after thorough investigation and trial. It would be impossible to say which type is best for you, because Motor Age's views might not coincide with your own as to the requirements. In other words, you may rest assured that whichever car you buy, you get your money's worth, whether you have an eight, four or six in it.

The eight has proven itself, after a year in the hands of owners, that it is a most

practical type, and the four and six are no longer questioned for all-around usage. The eight has unquestionably more even torque than the four or the six, granting that all are of an equal standard of engineering and manufacture. The eight has more power impulses per minute than the four or the six, and is a very pleasing engine to drive. On the other hand, the well-designed four of today is a good all-around car, as also is the six, and so it all comes back to a man's personal opinion of the kind of car he wants at the price he wants to pay.

In a word, all three types of motors are commercial successes, and either is good for popular use, if the product of a representative builder.

Error in Haynes Gearing

In answer to the inquiry of J. A. Baughman, Pulaski, Ia., in the Readers' Clearing House for September, the gear ratio and speed of the Haynes light six were incorrectly stated. The highest-g geared car has 4.07 to 1 gear ratio, the maximum speed is 60 miles per hour and the maximum number of crankshaft is in the neighborhood of 2,800 r.p.m.

No Rajah Magnetos

In answer to A Reader, Iowa Park, Texas, in the Readers' Clearing House, Motor Age, issue of September 16, it was stated that the Rajah magneto was used on the Lozier racing car. This is an error, as the Rajah people never have made magnetos. The magneto used was a Bosch, Rajah plugs being used.

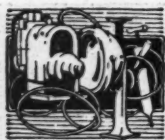
Cornelian and Scripps-Booth Motors

Kansas City, Kan.—Editor Motor Age—Kindly give me the size and make of motor used in the Cornelian and Scripps-Booth.

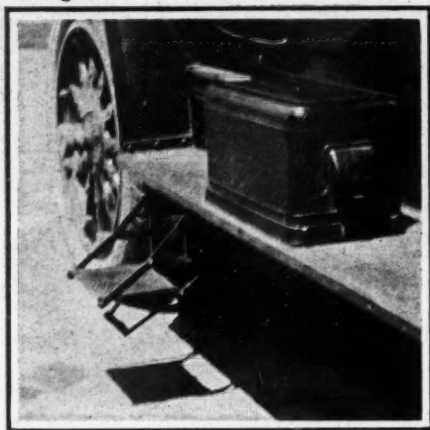
2—Also what is the number of 1915 cars turned out by the Chalmers company?—H. F. Seammon.

1—Sterling motors are used in both of these cars, the former using the 2.932 by 4.35 inches, and the latter, 2 7/8 by 4.

2—9,400.



The Accessory Corner



WEISS DISAPPEARING STEP

This view shows how the device looks when extended ready for use

Weiss Disappearing Step

THE Weiss Co., 329 West Market street, Indianapolis, Ind., has designed a disappearing step, for use on motor cars, that is operated from the driver's seat. When not in use the step disappears under the running-board of the car, and is protected against rattling. When extended, the step provides an easy means of access to the car and prevents pulling on the door. When folded, the device is out of sight. It sells for \$12. The method of operation is shown in the illustrations above.

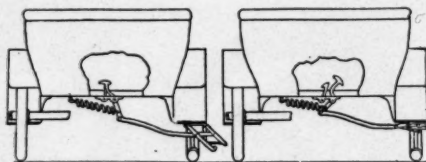
Anti-Rattler Adjustment Bolts

A device that is designed to eliminate the rattle in the steering gear of Ford cars has been brought out by the Eclipse Machine Co., Elmira, N. Y., under the name of the Eclipse anti-rattler adjustment bolts. The arms on the knuckles of the Ford front hubs are connected by a rod, the joints being held by cylindrical bolts,



A. P. L. GREASE DISPENSER

This outfit operates by a coarse-threaded screw plunger that forces $\frac{1}{2}$ pound of grease out each time the plunger is given on full turn

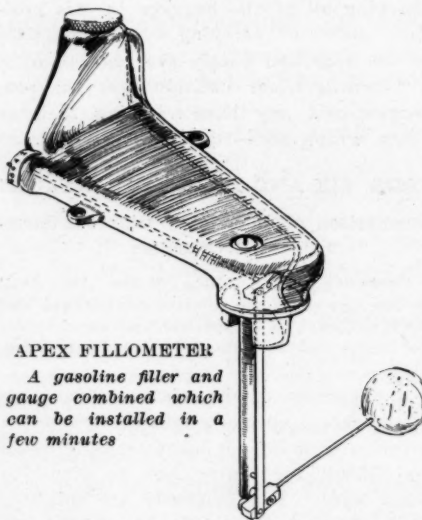


OPERATING METHOD OF WEISS STEP
Section of car showing how driver manipulates device

which in time become loose through wear. The Eclipse bolt replaces the originals and is adjustable. A split sleeve has a cylindrical exterior and a tapered interior. Through it passes a correspondingly tapered bolt, which can be inserted as far as necessary to expand the sleeve until the hole is snugly fitted, and the bolt is held in place by lock nuts. Wear is taken up by inserting the tapered bolt further. The bolt is fitted with an oil cup. Only a wrench is required for application. Price, per pair, \$1.

Apex Fillometer

A device for use on Ford cars is being brought out by the Apex Electric Mfg. Co., Chicago, under the name, Fillometer. The



APEX FILLOMETER

A gasoline filler and gauge combined which can be installed in a few minutes

fitment is attached to the seat of the car, under the cushions, the only part exposed being the opening for the gasoline intake and the registering device. The filling cap fits in the corner formed by the body and the front seat. When putting in gasoline, vent is afforded through a cored duct running from one end of the device to the other; this will be noted in the illustration herewith. The registering device is a float type, which operates an indicator on a quarter-round register. Price, \$4.50.

Wilmo Manifold

The Wilmo Co., 208 South La Salle street, Chicago, is marketing a combination intake and exhaust manifold that is designed to give more nearly perfect com-

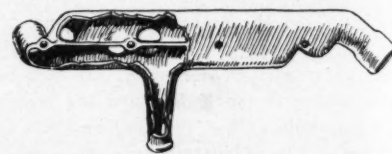
bustion, reduce consumption of fuel and give greater engine efficiency. The maker of this one-piece manifold claims 20 to 50 per cent increase in power, absence of carbon in cylinders and an economy in lubricants through the use of this device. Reference to the illustration elsewhere in this department will show the construction of the Wilmo manifold. The cut-away section shows the division between the intake and exhaust chambers. The action of the exhaust passing through the manifold heats and thus vaporizes the fuel.

This device sells for \$10, and a special size is made for Fords that sells for \$7.50. It is guaranteed by the maker for 10 years.

Lyon Resilient Spring Bumper

Designed along the lines of indestructibility the Lyon resilient spring bumper, made by the Metal Stamping Co., Long Island City, N. Y., is said to absorb the shock of impact through its flexibility, without the jar being imparted to the car itself.

These bumpers are made of carbon alloy spring steel and are fully guaranteed against bending or breaking when subjected to ordinary collisions. Connections for fitting to all cars are universal, there being no necessity for drilling through the frame of the car. It is said that attachment is but a matter of 15 minutes.



WILMO INTAKE-EXHAUST MANIFOLD

The passing of the exhaust in such close proximity to the intake chamber heats the latter and thus aids in vaporizing fuel



ECLIPSE ANTI-RATTLER BOLTS

Note the split sleeve through which passes a tapered bolt that is designed to take up as the coupling becomes worn

The Lyon bumper comes in three sizes—medium, large and a Ford special. Each design is finished in three ways—black enamel with nickel or brass clips; nickel-plated with black clips; brass-plated with black clips. The medium size is for small runabouts and light five-passenger cars. This size has a 2-inch face and a 55 to 64-inch adjustment from tip to tip. The large size is for larger runabouts and seven-passenger cars, and has a 2½-inch face and 58 to 66-inch adjustment. The Ford special has a 1½-inch face and 54 to 60-inch adjustment. The latter weighs 36 pounds; the medium, 41 pounds, and the large, 46 pounds. Prices are \$6, \$7.50 and \$9.50, respectively, for the Ford special, medium and large, finished in black enamel. For the other trimmings mentioned, the prices are \$8, \$8.50 and \$10.50, respectively.

A. P. L. Grease Dispenser

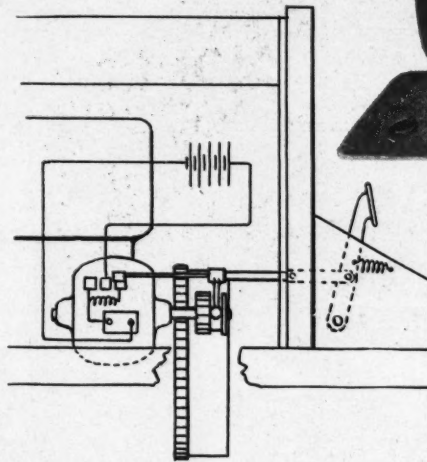
The Avery Portable Lighting Co., Milwaukee, Wis., has begun marketing a 25-pound capacity grease dispenser, made of seamless steel. A coarse-threaded screw plunger forces ½ pound of grease through a cone-shaped nozzle each time the screw-plunger is given one complete turn. The outfit is equipped with 6 feet of hose, which enables one to fill differential or gearset readily. The outfit sells for \$15.

Mutual Electric Starting Switches

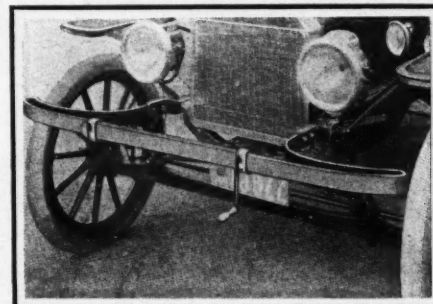
The Mutual Electric and Machine Co., Detroit, Mich., is bringing out two types of starting switches, which are shown elsewhere in this department. The type I consists essentially of a crown of vandam bronze finger springs, each finger being furnished with a polished cold-forged copper button contact. The current is delivered

MUTUAL ELECTRIC STARTING SWITCH

At the right is shown the device with the inner parts exposed, while below is given a diagram outlining the operation. Note the short throw from initial contact to full on



through four such buttons to a central copper cone, from which it is taken off by four other copper buttons. The central cone gradually changes its position during use, as it is perfectly free to turn on its axis. This presents new and unused sur-



LYON RESILIENT SPRING BUMPER

Made of carbon alloy spring steel and designed to absorb shocks without being imparted to the car

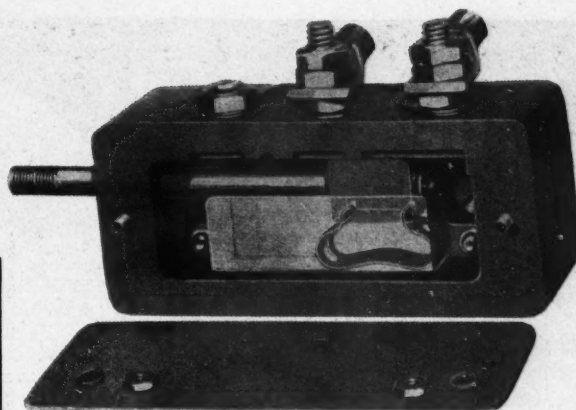
faces for contact from day to day, when in regular service.

The resistance type starting switch made by this concern has a very short, straight-line throw from initial point to full on. The working parts are entirely surrounded by a thick thermal and electrical insulation wall, designed to protect the parts from becoming headed.

The resistance is composed of a high-grade resistor alloy and this is inclosed in a fire-proof, well-ventilated pocket, integral with the body of the switch itself. This switch is said to have a very low millivolt drop when carrying currents in excess of those to which it is subjected when in regular service on the motor car.

Allwon Motor Goggles

Motor goggles which have two-color lens have been brought out for the purpose of, in the language of the manufacturer, ab-

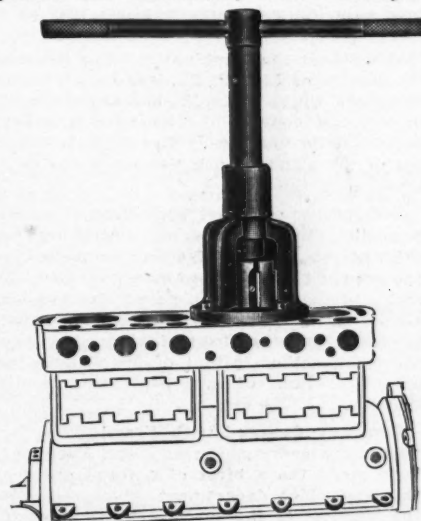


sorbing optical shocks on the road. The two-color lens is not made of two pieces joined but of a solid lens of one piece of glass. One is colored darkly enough for the brightest lights, and the other part is left light enough for ordinary use. The color is introduced into the glass becoming part of it, although the surface of the lens is not disturbed and every part is clearly transparent. The two-color motor glasses, medium size, are sold for \$12 a dozen, the large size, \$13.50 a dozen. With side shields, the regulation size sells for \$13.50 and a larger size at \$15 per dozen. They are made by Strauss & Buegeleisen, New York.

Davis Cylinder Reboring Tool

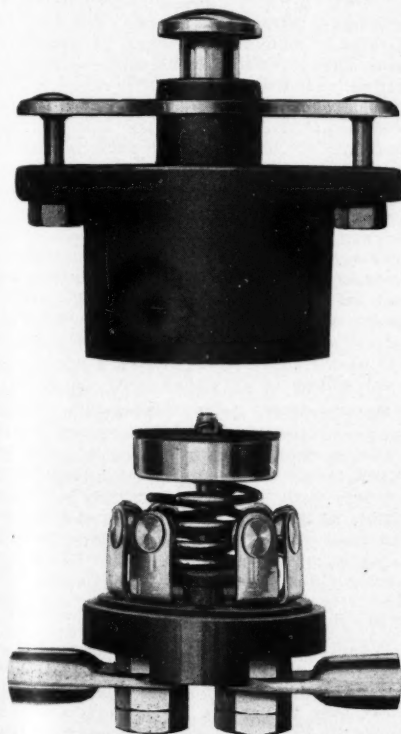
The Hinckley Machine Works, Hinckley, Ill., is offering the Davis cylinder reboring jig and reamer for reboring Ford cylinders, which is designed for the use of small shops and garages, without going to great expense in the installation of special machinery. The reamer is adjustable to several sizes and the blades can be reground when worn.

It is said that one man can rebore a set of four cylinders in 1 hour, including the make ready. The tool centers itself and the manufacturer says an inexperienced man can do as good a job as an expert machinist. The device weighs 45 pounds and lists at \$75, f. o. b. factory.



DAVIS CYLINDER REBORING TOOL

Adjustable to size, centers itself, weighs 45 pounds and is designed for the small shop or garage



MUTUAL TYPE I STARTING SWITCH

Crown is of vandam bronze springs. Four copper buttons deliver current and four receive it



MODERN PRAIRIE SCHOONER BUILT ON CHANDLER CHASSIS—What luxury is represented in the above illustration when compared with the strenuous passage of the forty-niner across the continent! Nineteen-fifteen has given birth to some strange touring equipages, of which the above is an example. Using the chassis of a Chandler six that had been rescued from a fire, this modern prairie schooner was built on as a body and the two seen enjoying a noonday meal are making a cross-country trip in the vehicle.

THEY Lost the Combination—The commissioners of Lincoln, Ill., last week intended to pass a wheel-tax ordinance but the vault in which a copy of the measure was kept could not be unlocked. The city clerk was out of town and no one else knew the combination of the lock.

Disapproves of Street Sprinkling—The Automobile Club of America disapproves of the ancient practice of street sprinkling on the ground that it causes motor cars to skid and also that it injures paved surfaces. It advocates the flushing of streets by night as being superior to sprinkling, but says the ideal method is that of dry cleaning by a combination of sweeper and vacuum systems.

Company Charged with Fraud—The Carnegie Engineering Corp., New York, has been made the subject of a fraud order by the post office department which describes the business of the concern as being an ingenious scheme for swindling motor car agencies in the name of the noted steel magnate. It is alleged that dealers were solicited last spring and during the last summer to advance a deposit of \$50 on each

car ordered for September delivery. It is said that numerous agencies placed orders.

Mayor Runs Jitneys—Angered by the refusal of the Public Service Railway Co., West York, N. J., to place additional cars in service in that town, the mayor, Oscar Heide, has started a jitney bus line in opposition to the trolley company. He placed four cars in service and will run them over the same route as the trolley cars.

Motor Car Owners Hit—Motor car owners to the number of 150 have been cited to appear before the board of review at Peoria, Ill., to explain why they should not be assessed on their cars as personal property. Examination of the records of the secretary of state shows that many residents of the county in which Peoria is located failed to schedule their cars.

Seek Reciprocal License Privileges—The New York State Motor Federation is preparing plans with the purpose in mind of bringing about reciprocal license privileges between New York and Ontario. At present New York motorists as well as all others from the States must obtain a Canadian

license, or in other words, are taxed from \$5 to \$20 for going into Canada. It is believed if this proposition can be accomplished it will stimulate touring in the province of Ontario by American citizens.

Crosses Africa in Record Time—J. W. Kirkland, managing director of the South American Electric Co., Johannesburg, South Africa, recently made a 1,097-mile trip from Johannesburg to Cape Town. Although encountering many difficulties the trip was made in 97 hours elapsed time, shattering the record made by a member of the Transvaal Automobile Club by 4 days.

Ford Would Hire Convicts—Henry Ford recently announced to the prison warden at Jackson, Mich., that he would employ all discharged convicts from the institution as fast as they are released. "I have yet to meet a thoroughly bad man," says Mr. Ford. "Every man has his good qualities and they will assert themselves if given a chance and I am willing to give them that chance."

Motors Must Carry Lights—The Illinois state law provides that motor cars on the highway—which means streets as well—between the hour of sunset and 1 hour before sunrise shall show two white headlights visible at least 200 feet in front and one red tail light. There is no distinction between a car in motion or at the curb. The penalties provided are not less than \$10 nor more than \$100. The costs, being state cases, are \$8.80.

When Is a Bus a Jitney?—The jitney bus is a thing of the past in Moline, Ill. When an ordinance became effective requiring these cars to operate under certain restrictions, the owners changed the name to taxicabs and removed all signs indicating the fare or destination. There was no change in the rate charged, however, 5 cents being demanded for a haul to Rock Island and 10 cents to Silvis. The council is floored

unless the city attorney can point out a way to prove that the taxicabs are jitneys. A test case is likely.

Jitney Question to Referendum—A popular vote will settle the fate of the jitney bus in Springfield, Ill. A petition with 3,500 names, asking that the Reece ordinance which virtually puts the busmen out of business, be submitted to a referendum vote has been filed. The jitney bus owners have organized the Springfield Auto Service Association. They object to the Reece ordinance as being unlawful, unconstitutional and too stringent.

New Armored Motor Car—A novel type of armored motor car has been designed by a resident of Lowell, Mass. The car is shaped like a turtle, the upper and lower shell being joined about 16 inches above the ground. The wheels are almost entirely covered by the armor. It has a periscope for steering, emergency doors on the rear and on both sides, a powerful motor under the driver's seat, and a quick-firing gun mounted on a revolving base.

Would Cross Continent without Food—Motor car manufacturers often receive interesting and unique propositions from persons who want to make motor trips across the country, but the climax is believed to have been reached by Otto Norabo, Chicago, who proposes to drive an eighty-cylinder King from New York to San Francisco without eating. Norabo bases his contentions for seriousness in the matter that he has fasted 30 days without ill effect.

Motor Truck Plows Salt—One of the world's natural speedways is being torn up, ground and dispensed to the public in cartons and packages—their contents forming one of the necessities of civilization, ordinary table salt. The scene is not far from Salt Lake City, Utah. The motor truck trundles along while in its wake an ordinary plow turns over furrows of salt 4 inches deep. It is said the deposit of salt, which is one of Utah's natural resources, is almost limitless.

Good Roads Activities

Campaign for Road Bonds—David O. Thomas, superintendent of highways for St. Clair county, Illinois, has launched a campaign for a \$2,000,000 bond issue in that county for a system of permanent roads.

Pennsylvania Toll Road Passes—By the purchase of the toll road owned by the Harrisburg, Carlisle and Chambersburg Road Turnpike Co., extending from the dividing line of Cumberland and Franklin counties, Pennsylvania, to the borough limits of Chambersburg, by the state of Pennsylvania, the road will be opened to free travel. The price paid for the road was \$25,000.

Importance of Road Location—Professor B. K. Coughlan, an engineer in the agricultural and mechanical college of Texas, says that the policy of blindly following property lines and of locating roads without any regard to engineering principles, as well as trying to suit the whims of too many people, has resulted in roads that are not so short and convenient as could have been secured had a little more thought been given previously to the time the building began.

Keystone Roads Logged—A map of the main highways of the central part of the state of Pennsylvania, leading to Harrisburg, of much benefit to motorists and the traveling public in general, has been prepared by the state highway department and the Motor Club of Harrisburg. The map also gives the proposed Lincoln highway feeders from Harrisburg to Gettysburg and Lancaster, which points are touched by the Lincoln highway on the main route from New

York to San Francisco. Large arrows indicate the regular Lincoln highway route and small arrows the feeders into Harrisburg.

Establish Burlington Way Division—Good roads boosters met at Astoria, Ill., last Monday, to establish the Beardstown-Rock Island division of the Burlington Way. A route was selected based upon agreements to keep the various sections in good condition.

Pledge Wolverine Paved Way Fund—Manufacturers and jobbers of Lansing, Mich., met at the chamber of commerce last week and pledged \$25,000 toward the construction of the Wolverine paved way. They raised \$17,250 at the meeting.

Ohio Road Department Unchanged—Under the provisions of the Cass highway law, now in effect in Ohio, the entire highway department will not have to reorganize. The passage of the Cass law abolished part of the laws under which the department had been operating, but did not render necessary the reorganization of the interior departments and bureaus under the new provisions.

New York Leads in Highway Building—According to the report of the state highway commissioner, New York stands first in road construction, having completed and accepted 863 miles of road last year and contracted for 1,148 miles, a large per cent of which is now open to traffic. The state highway commissioner in his annual report recommends that foreign cars using New York roads should be required to pay some burden of the making.

Chicago-Milwaukee Road Campaign—Business men of Milwaukee, Wis., have organized a campaign to induce the permanent improvement of Sheridan drive from Chicago to Milwaukee, and the association is known as the Sheridan Road Improvement Association. The principal object is to encourage Racine and Kenosha counties in Wisconsin to complete a concrete highway from Milwaukee to the Illinois state line, and to induce the Illinois cities and counties through

which Sheridan road passes to place it in good condition by permanent improvement. Milwaukee county has finished its part of the work, but Racine and Kenosha have several miles to build.

Demonstration of Highway Construction—The Tennessee highway commission has planned a practical and instructive demonstration in road building for the Tennessee state fair. Various methods from the Applan Way, that had its conception 312 years before Christ, down to the present time will be shown.

North and South Road in Missouri—The first 50-mile stretch of a permanent north and south road in Missouri—that between Joplin and Noel—was dedicated last week. Fully 3,000 persons participated in the ceremonies at Anderson, Mo. This road, besides giving the counties of southwestern Missouri a northern outlet, will within a year open up to them Arkansas and the entire South.

Warns Against Highway Support—The Ohio Good Roads Federation has adopted resolutions against the state and citizens giving aid to cross-state road propositions which are beginning to spring up as a result of Ohio and other states backing the Lincoln and Dixie highways. The public is warned against giving moral or financial support to these highway propositions unless they are approved by the state highway department.

Governor Will Inspect Highways—Pennsylvania's highways will come in for a close inspection on the sightseeing trip of Governor Brumbaugh and more than 100 other persons, who will be his guests, the trip starting from Harrisburg October 4. The state highway department has completed the plans and arranged the itinerary and an inspection trip will be made by two officials of the department next week. The route will cover half the counties of the state, sections which are notable for natural beauty being included.

Coming Motor Events

CONTESTS

October 1-2—Track meet, Trenton, N. J.
*October 2—Speedway races, New York.
*October 2—100-mile track races, Fresno, Cal.
October 9—100-mile Invitation Race, Indianapolis, Ind.
October 9—100-mile track race, Mattoon, Ill.
October 16—Speedway races, Chicago.
November 15-20—El Paso-Phoenix road race.
November 20—Road race, Corona, Cal.

*Sanctioned by A. A. A.

SHOWS

September 26-October 10—Denver, Colo., show.
September 30-October 3—Salem, Ore., show.
October 2-9—Cincinnati, O., show.
October 4-9—St. Louis, Mo., show.
October 4-9—Fort Worth, Tex., show.
October 6-16—New York, electrical show.
October 15-16—San Diego Exposition show.
October 16-23—Pittsburgh, Pa., show.
October 16-22—Montreal show.
November 1-3—Pasadena, Cal., show.
January 1-3—New York show.
January 22-29—Chicago show.
January 29-February 5—Minneapolis show.
February 7-12—Kansas City, Mo., show.
March 4-11—Boston show.

CONVENTIONS

October 4-6—Columbus, O., Garage Owners' Convention.
October 14—Chicago, S. A. E., Standards Committee meeting.
October 17-18—Cleveland, O., Electric Vehicle Association of America.

With the Motor Clubs

Club Seeks \$700,000 for Roads—The Automobile Club of Minneapolis, Minn., desires the board of tax levy to provide not less than \$200,000 for Hennepin county roads during 1916. Further, the club officials say, it is believed the taxpayers of the county favor such appropriation.

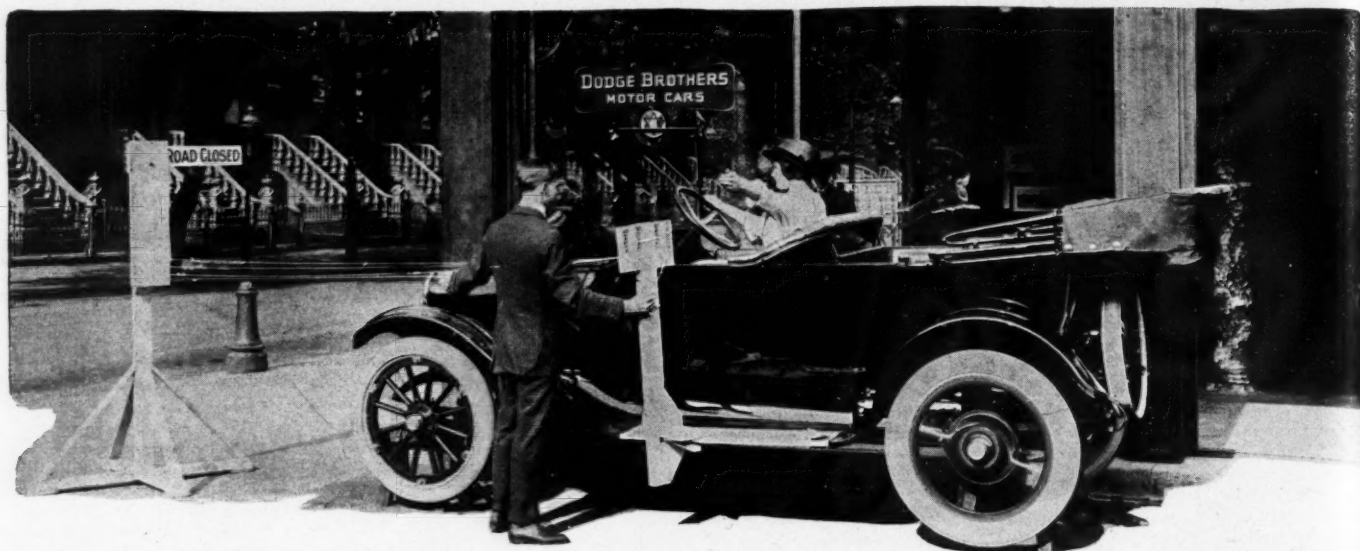
Club Would Indict Supervisor—Governors for the Erie Motor Club, Erie, Pa., have instructed the club's attorney to gather evidence in an effort to secure an indictment against one of the supervisors of North East township for alleged neglect of the roads in his district. Complaint was made of the bad condition of the street railway crossing.

Club Is for Near-Side Stop—The Omaha Automobile Club, Omaha, Neb., will attempt to have the city council stand firm with regard to the near-side street car stop ordinance. It is the belief of the directors of the club that by far the greatest number of the people of the city want the near-side stop. They are also convinced that the new regulation of traffic cuts down the number of accidents.

Organizing Club at St. Louis—The Riverside Club, St. Louis, Mo., which is to be general headquarters locally for motoring, yachting and aviation enthusiasts, is being organized. Among the 37 charter members are Mayor Henry W. Kiel, of St. Louis and Mayor Fred W. Mollman, of East St. Louis, Ill. The club has an option on 10 acres of ground, facing the Mississippi river, which it plans to buy, on which to build a clubhouse as soon as convenient.



Among the Makers and Dealers



NOVEL Device to Teach Driving—A novel device to aid women motorists, and men, too, for that matter, in learning to control their cars without the necessity of getting out into the traffic, has been developed by Bishop, McCormick & Bishop, Dodge dealers in Brooklyn. All four wheels are jacked up and the pupil takes the driver's seat and is instructed in starting the car, etc. A semaphore with several arms is placed in front of the car. These arms are

controlled by the salesman who stands nearby. By pulling the proper cord he causes an arm with the phrases, "Road Closed," "Steep Hill," "Bad Curve," etc., to be thrown before the car and the pupil is required to do the proper thing in handling the car in this emergency. The device has proven a great help in instilling confidence in people who wish to learn to drive in a short time and it has been adopted by a number of motor car salesmen in the east.

JOHN & ARTHUR Move—The John & Arthur Co., one of the biggest accessory houses in Boston, Mass., has outgrown its salesrooms. It will be located at 165 Massachusetts avenue shortly after October 1.

Fisk Adds at Portland—The Fisk Rubber Co., Portland, Ore., opened its new home last week. The new store is the northern division office, which is in charge of R. D. MacPhal acting as administrative officer for all of the territory embraced by the states of Oregon, Washington, Idaho and British Columbia.

Barnett King Factory Representative—Ira S. Barnett, until 3 weeks ago president of the Kentucky Automobile Co., Cadillac dealers, has been appointed factory representative of the King in Kentucky and southern Indiana, with headquarters in Louisville. Mr. Barnett is one of the pioneer motor car dealers in this section of the country.

K. C. Tire Gets Plant?—It is reported that the factory and general offices of the Kansas City Tire and Rubber Corp. are to be established in the old buildings of the Keystone Iron and Foundry Co., at Central avenue near the Kaw river, Kansas City, Kan. It is said that the company, which is opening these offices, now has an eastern factory at West Chester, Va. Tires and accessories will be manufactured at the Kansas City plant.

Kissel Making Extensive Additions—The Kissel Motor Car Co., Hartford, Wis., has broken ground for the first of a series of important new construction operations which will accommodate an increased output almost double of the present production of passenger cars and trucks, as well as facilitate vehicles coming through the factory and eliminate all waste and unnecessary loss of time in manufacturing, assembling, finishing and shipment. Under the direction of O. P. Kissel, vice-president, contractors have started work on three new buildings, consisting of a new enameling shop, 70 by 110 feet; a shipping warehouse, 44 by 100 feet; a loading platform, 15 by 150 feet; and an

addition to the body shop, 50 by 50 feet, 2-story. As soon as certain real estate formalities are disposed of, a new office build-

The Show Circuit



Wellington, Kan., Show—Plans are under way for holding a motor car show at Wellington, Kan., during the week of the farmers' institute. The dates have not been set definitely yet, but probably will be some time in October.

Bloomington, Ill., Show—W. L. Martin, secretary of the McLean County Automobile Club, Bloomington, Ill., has announced that all the preliminaries for the 1916 motor car show have been completed. The John Deere building has been secured and February 15, 16 and 17, 1916, have been selected as the dates for the event.

Cincinnati, O., Show—Developments of the last week indicate that the motor car exposition to be held at Cincinnati, O., October 2-9 will eclipse any previous show ever held there. The show is being arranged by the Cincinnati Automobile Dealers' Association, which vouches for the fact that practically every car made in the United States will be on display there on the dates mentioned.

Dallas, Tex., Show—Plans are practically complete for the Texas motor car show at Dallas during the Texas state fair, October 17 to 31, inclusive. A stone structure inside the fair grounds has been remodeled and plans have been made for the greatest exhibit of cars the south ever has had. Practically every make of car in the United States will be on exhibition. Detailed plans for the exhibit are in charge of J. W. Atwood of the Dallas Automobile Club.

ing will be erected. It will be four stories high, 50 by 100 feet. The enameling shop is to be ready October 15; the shipping house, November 1, and the body shop addition November 15.

Rickenbacher Uses Oilzum—Eddie Rickenbacher, who set a new record for a 1-mile course in the 100-mile race at Providence, R. I., September 18, used Oilzum lubricant in his Maxwell.

To Erect Big Plant—The E. E. Wentworth Corp., of Maine, that has the entire distribution of Overland cars for that state, is to erect a big plant at Springvale for the manufacture of cars, bodies, etc. It will cost \$50,000.

Ajax Erects Big Sign—The new Ajax tire sign being erected by the Guenther-Methudy Sales Co., at St. Louis, Mo., is said to be the largest electric sign west of the Mississippi river. The sign is 103 feet long and the letters are 6 feet high.

To Make One Tire of Two—The Reliable Double-Tread Tire Co. has opened an office and workshop at Louisville, Ky. J. F. Oswald is the new manager. The concern announces that it is prepared to take two old casings and make a new tire of them. It is in the market for old tires.

Columbia Motor May Move—It is possible that the Columbia Motor Truck Co. will move to Pontiac, unless negotiations now pending end favorably. The company wants larger quarters and may take the plant now occupied by the Limousine Top Co. when the latter's lease expires and this concern occupies a larger plant.

Hartford Company Increases Capital—At a meeting of the board of directors of the Billings & Spender Co., Hartford, Conn., last week, it was voted to increase the capital stock from \$300,000 to \$500,000. This increase is needed to finance the acquisition and incidental remodeling of the plant of the Columbia Motor Car Co. to meet requirements. Big improvements have been made in the property. The original forge shop has been raised, a similar addition has been put

up parallel with it and a new power station built. The original boiler rooms have been remodeled into a garage.

Will Cut Body Prices—The Commercial Auto Body Co., St. Louis, Mo., will soon announce a cut of from \$10 to \$25 on all commercial bodies. This reduction in price, according to Hugh F. Cartwright, president of the company, is due to decreased cost of production since the firm has occupied its new building.

Ford Restrains the Use of Trade Mark—T. A. Beament, counsel for the Ford Motor Co. of Canada, Ltd., recently appeared before the court at Ottawa and secured an interim injunction "restraining the Ottawa-Beach Motor Co. and its servants and agents from using the Ford company's trade mark in any advertisements, and from otherwise indicating or implying that the Ottawa-Beach Motor Co. is the authorized dealer of the Ford company. This action was rendered necessary by the policy of the Ford company in restricting the sale and advertising of its cars to one accredited dealer in each district." The accredited Ford dealer

for that district is the Everyman's Car Co., Ottawa, Ont.

Used Cars in St. Louis—The used car report of the St. Louis Manufacturers' and Dealers' Association, St. Louis, Mo., for September shows 89 sales of 33 different makes of cars. This is the largest number of used car sales ever reported by St. Louis dealers. It is common knowledge that the actual number of cars sold since the last report was far in excess of 89, but all dealers have not yet become accustomed to reporting the sales of used cars.

Packard Officials Honored—On the occasion of the shipment of the first Packard twin-six cars the Packard Motor Car Co., Detroit, Mich., arranged a rather unusual function to show its appreciation to the two officials of the company to whom most of the credit for the new Packard models is due. About 150 of the heads of departments and officers of the company assembled to be the witnesses in the presentation of a silver tea service to J. G. Vincent, vice-president of engineering, and one to F. F. Beall, vice-president of manufacturing, these being

given at the direction of the board of directors.

Draper Dies at Brooklyn—Clifton F. Draper, who has represented the Champion Spark Plug Co., Toledo, O., during the last year, died at his home in Brooklyn last week following an illness that necessitated an operation, which was performed in Dallas, Tex. Mr. Draper, previous to becoming identified with the Champion company, was affiliated with Stanley & Patterson, electrical supply dealers in New York.

Timken Axle Adding—Of the several new buildings which will eventually double the present size of the Timken-Detroit Axle Co.'s plant, one of the biggest was recently completed and now is in full operation. This is the four-story structure which now is entirely used as an assembly plant for worm-drive commercial car axles. The total floor space of the building is about 100,000 square feet and with its equipment of machines and machinery cost about \$500,000. Work is well under way on the new drop forge plant. All departments are working to their full capacity.

New Garages, Repair Shops and Service Stations

Town	Firm	Supplies
Los Angeles	Universal Specialty Co.	Repair
COLORADO		
Denver	Harry Hayutin	Garage
Denver	Frank Loveland	Garage
Idaho Springs	George Stroehle Sons	Garage
CONNECTICUT		
New Britain	Gunn Rubber Co.	Accessories
IDAHO		
Troy	Olson, Johnson & Co.	Garage
ILLINOIS		
Canton	Joiner & Son	Repair
Freeport	Service Garage	Garage
Freeport	Rigney & Knipschild	Garage
Frankfort	Felker Bros.	Garage
Geneva	George Ekdahl	Garage
Havana	Harsman & Coppel	Garage
Jacksonville	Howard Zahn	Garage
Mackinaw	Samuel Ferree	Garage
Morrison	Joseph Gsell	Garage
Ottawa	Joseph A. Hampson	Garage
Pana	Thomas & McTaggart	Garage
Pekin	Edds & Joeger	Garage
Peoria	Moutier Bros.	Garage
Peru	J. E. Seep & Co.	Garage
Rockford	R. A. Herrington	Garage
Rock Island	Herman Hansen	Garage
Towanda	Schwab & Grath	Garage
INDIANA		
Goshen	Perry Yoder	Garage
Laporte	Carl Peterling	Garage

Town	Firm	Supplies
Winfield	J. E. Davenport	Service
KENTUCKY		
Louisville	Dixie Auto Supply Co.	Tires
Owensboro	L. D. Baer	Garage
MASSACHUSETTS		
Boston	J. W. Maguire	Service
Springfield	Corson-Berry Co.	Service
Worcester	Blue Ribbon Garage	Service
MICHIGAN		
Detroit	J. Dun	Repair
MINNESOTA		
Hayward	Hayward Auto Co.	Garage
Red Wing	William Busch	Garage
MISSOURI		
Kansas City	Eylar Bros.	Garage
St. Joseph	Tom R. Hebert, Master Carbueter	Garage
St. Joseph	Don Riley	Garage
OHIO		
Cincinnati	Carbueter Sales Co.	Garage
Stambaugh	Thompson Co.	Garage
OKLAHOMA		
Oklahoma City	Lightning Machine Co.	Garage
Okmulgee	James Curtner	Garage
Thomas	Robinson & McKellogg	Garage
OREGON		
Portland	Hercules Tire Sales Co.	Service
Portland	Oregon Motor Car Co.	Garage

Town	Firm	Supplies
Harrisburg	Russ Bros.	Garage
Sunbury	Ford Garage	Service
TEXAS		
Waco	Courthouse Garage & Supply Co.	Garage
WASHINGTON		
Seattle	Edward Cumpson, Swinehart Tires	Garage
Spokane	W. J. Ball Motors Co.	Garage
Spokane	Child, Day & Churchill Co.	Tires
Tacoma	Griffith Motor Co.	Tires
WISCONSIN		
Bear Creek	Ferdinand Larson	Garage
Reaver Dam	Martin Mohr	Repair
Burlington	Luke & Voltz	Repair
Kilbourn City	E. E. Seiberth	Garage
Milwaukee	Gross Hdw. Co.	Accessories
Mineral Point	P. O. Vivian	Garage
New London	E. H. Ramm	Garage
Omro	Frederick Glines	Garage
West Allis	W. C. Engel	Repair
West Allis	Reliance Garage Co.	Repair
CANADA		
Montreal	International Garage	Garage
Montreal	Maritime Motor Car Co.	Accessories
Montreal	Model Service Garage	Garage
New Westminister, B. C.	Alex. Speck & Son	Repair
Ottawa, Ont.	Ottawa Taxi & Auto Co.	Tires
Quebec	Ald. U. Gauvin	Garage
Vancouver, B. C.	J. A. Karr Tire Co.	Accessories
Vancouver, B. C.	B. T. Rogers	Garage

Asheville, N. C.—Asheville Garage Co.; capital stock \$10,000; incorporators, E. C. Palmer, J. P. Hill and A. G. McGraw.

Boston, Mass.—Brookline Taxi Co.; capital stock \$25,000.

Chicago, Ill.—Sprub Tire Co.; capital stock \$2,500; incorporators, Jacob Levin, David Blumrosch and Lazarus Krinsky.

Cleveland, O.—Fred B. Brand Motor Co.; to deal in motor cars and motor vehicles; capital stock \$30,000; incorporators, Fred B. Brand, Richard H. Lee, W. J. Patterson, S. D. Corlett and G. M. Gallagher.

Cleveland, O.—Cole Cleveland Co.; capital stock \$10,000; incorporators, C. D. Simmons, F. M. Dodge, M. C. Haugh, H. G. Blandford and C. B. Bayly.

Cleveland, O.—K-K Company; to deal in motor cars, motor oils, accessories, etc.; capital stock \$15,000; incorporators, F. W. Emelle, F. Wilkes, C. Myers, H. Frye and George W. Greenwald.

Cleveland, O.—Keystone Oil & Supply Co.; to deal in motor oils; capital stock, \$10,000; incorporators, Richard H. Lee, W. J. Paterson, G. M. Gallagher, E. M. Holmgren and S. D. Corbett.

Cleveland, O.—Motor Equipment Co.; to deal in accessories; capital stock \$10,000; incorporators, O. D. Summers, H. K. Summers, W. H. Everhart, M. Manshewer and J. B. Moore.

Cleveland, O.—Ohio Electric Sales Co.; capital stock \$10,000; incorporators, Otis K. Herron, Walter A. Albaugh, Luther Day, Rufus E. Bixby and J. B. Kanner.

Columbus, O.—Ideal Light Car Co.; capital stock \$100,000; incorporators, J. Herman Axline, C. O. Howard, S. C. Hill, Fred E. Hill and Barton Griffith.

Columbus, O.—Peters Sales Co.; to sell the Brinnon Ford starter; capital stock \$10,000; incorporators, Charles M. Peters, Albert Peake, George A. Peters and J. B. McGaughy.

Columbus, O.—Shilling Safety Auto Bumper Co.; to manufacture auto bumpers; capital stock \$100,000; incorporators, Frank W. Schriener, Edward C. Shilling, Jacob Dagger, R. N. Ulrey and J. C. Erwin.

Crosbyton, Tex.—Texas Auto Co.; capital stock \$1,000; incorporators, A. J. McKinnon, G. E. McGee and C. W. Murray.

Dennison, Tex.—Dennison Motor Car Co.; capital stock \$5,000; incorporators, B. S. Benedict, Frank Platter and W. W. Lankford.



Detroit, Mich.—Falcon Motor Truck Co.; to manufacture motor trucks; capital stock \$20,000; incorporators, Albert B. Hazzard, Otis B. Mallon and Frank T. Lodges.

Detroit, Mich.—General Mfg. Co.; to manufacture and deal in motor car accessories; capital stock \$5,000; incorporators, Charles W. Olson, Charles R. Robertson and Henry Wild.

Detroit, Mich.—National Bronze & Aluminum Castings Co.; capital stock \$10,000; incorporators, P. J. Donnelly, V. R. Donnelly and Robert L. Pratt.

Harvey, N. D.—Blanding Motor Co.; capital stock \$10,000; incorporators, C. H. Blanding, Adelaide A. Blanding, Millie L. Blanding.

Houston, Tex.—Texas Auto Co.; capital stock \$1,000; incorporators, A. J. McKinnon, C. M. McGee and C. W. Murray.

LaCrosse, Wis.—Zimmer Motor Car Co.; to deal in motor vehicles, accessories, etc.; capital stock \$5,000; incorporators, J. E. Zimmer, O. H. Matzke and S. J. Zimmer.

Lansing, Mich.—Lansing Motor Co.; capital stock \$60,000.

Llano, Tex.—Llano Motor Co.; capital stock \$50,000; incorporators, M. D. Slaton, M. M. Moss and E. G. Bogusch.

Marshall, Ill.—Marshall Motor Co.; capital stock \$12,500; incorporator, Albert Soekler.

Montreal, Que.—Grant Distributing Co. of Canada, Ltd.; capital stock \$20,000.

New Orleans, La.—Mohawk Motor Corp.; capital stock \$100,000; incorporators, J. Bart Davis and others.

New York—Eastern Rubber Co.; capital stock \$50,000.

Noblesville, O.—J. Joseph & Co.; capital stock

\$15,000; incorporators, Louis N. Joseph, Wallace Moore, Charles Lyons.

Pierre, S. D.—United States Wheel & Tire Co.; to manufacture motor cars, wheels, tires and trucks; capital stock \$300,000; incorporators, E. S. Gleason, S. D. Ross, C. Cabot, L. H. Moore, E. G. Hoffman, H. P. Moses, J. Roy Atwood, R. M. Wilcox and George W. Shaw.

Seattle, Wash.—Jacqueline Auto Steel Wire Tire Co.; capital stock, \$100,000; incorporators, Eugene Jacqueline, Evan Gough, J. R. Cabanne.

St. Louis, Mo.—H. Bender Tire Co.; capital stock, \$2,000; incorporators, S. Vazis, H. W. Killersman, C. F. Mieke.

St. Louis, Mo.—H. S. H. Mfg. Co., maker of radiator caps; capital stock, \$10,000; incorporators, P. G. Hoffman, H. A. Hood, Garrard Strode.

St. Louis, Mo.—Velle Automobile Co.; capital stock, \$47,500; incorporators, Herman L. Schnurr, Alexander Steiner, William L. Hausmann.

South Bend, Ind.—No-Leak Rubber Tire & Tube Co.; capital stock, \$12,000; incorporators, F. J. Cosgrove, F. A. Hull, B. J. Engledrum.

South Bend, Ind.—Zeglen Tire and Fabric Co., rubber and fabric products; capital stock, \$50,000; incorporators, C. Zeglen, E. R. Dean, F. I. Hardy.

Strum, Wis.—Strum Motor Car Co.; to deal in new and used motor cars, supplies, etc.; capital stock \$2,500; incorporators, M. P. Skogstad, N. G. Peterson and Joseph Mahlrom.

Toledo, O.—Universal Motor Co.; capital stock, \$100,000; incorporators, Howard Lewis, Harold J. Kehoe, Frank S. Lewis, Paul W. Alexander, Frederick W. Gaines.

Toronto, Ont.—Pulman Motors, Ltd.; capital stock \$100,000.

Utica, N. Y.—R. and V. Motor Co.; capital stock, \$10,000; incorporators, W. A. Van Wie, J. M. and G. B. Russell.

Utica, N. Y.—Wood Auto Supply Co., to manufacture and deal in tires; capital stock, \$25,000; incorporators, C. J. Wood, G. E. Camp, E. M. Willis.

Vancouver, B. C.—Ford Lock Co.; capital stock, \$25,000; incorporators, B. P. Youmans, J. M. Hoff, G. B. Simpson.

Waco, Tex.—Courthouse Garage & Supply Co.; capital stock \$5,000; incorporators, J. J. Richard, John McGlasson and James E. Watson.

Recent Agencies Appointed by Motor Car Manufacturers

PASSENGER CARS

Town	Agent	Make
Juneau, Alaska.....	C. A. Baldwin.....	Hupmobile
ALABAMA		
Birmingham.....	Birmingham Motor Co.....	King
Birmingham.....	Paul Crawford.....	Chandler
Hope.....	C. C. Spragins.....	King
Little Rock.....	S. B. Thomas Auto Co.....	Hupmobile
Paragould.....	W. S. Coleman & Sons.....	Halladay
CALIFORNIA		
Los Angeles.....	Bekins-Speers Motor Co.....	Grant
Los Angeles.....	Colyear Motor Sales Co.....	Regal
Los Angeles.....	Stone-Dancy Motor Sales Co.....	Holler
Los Banos.....	P. Knudsen.....	King
Monrovia.....	V. C. Isaacs.....	Oldsmobile
Monrovia.....	Foulke & Deatherage.....	Cadillac
Monrovia.....	Foulke & Deatherage.....	Chevrolet
Monrovia.....	Foulke & Deatherage.....	Oldsmobile
Monrovia.....	Foulke & Deatherage.....	Paige
Redlands.....	Park Garage.....	Chandler
Redlands.....	Park Garage.....	Oakland
Redlands.....	C. H. Clem.....	Cadillac
Redlands.....	C. H. Clem.....	Chevrolet
San Francisco.....	Herbert A. Blumenthal.....	Ross
COLORADO		
Akron.....	City Garage.....	Grant
Boulder.....	James A. Outter.....	Metz
Boulder.....	Frank Deckelman.....	Stearns
Buena Vista.....	Dr. W. C. Fletcher.....	Haynes
Burlington.....	George Danforth.....	Metz
Calhan.....	Russell Gates.....	Grant
Canon City.....	J. E. Myers.....	Grant
Cheyenne Wells.....	D. K. Purdy.....	Metz
Colorado Springs.....	Ferguson & Ingersoll.....	Stearns
Colorado Springs.....	E. D. Marr.....	Haynes
Colorado Springs.....	H. N. Richmond & Sons.....	Grant
Denver.....	Platt-Fawcett Motor Co.....	Paige
Eaton.....	C. W. Schultz.....	Grant
Elizabeth.....	Russell Gates.....	Grant
Fairplay.....	H. Bergstrand.....	Apperson
Flagler.....	Lewis Clark.....	Metz
Fort Collins.....	C. B. Mossman.....	Inter-State
Fort Collins.....	L. W. Van Dyke.....	Metz
Fort Collins.....	E. O. Shindar.....	Studebaker
Fort Morgan.....	A. C. Gillette.....	Grant
Fort Morgan.....	J. M. Scofield.....	Metz
Greeley.....	C. C. Kersey.....	Inter-State
Greeley.....	F. P. Meeker.....	Metz
Haxtun.....	M. Anderson.....	Metz
Iliff.....	W. F. Alexander.....	Metz
Leadville.....	Cloud City Garage.....	Haynes
Idalia.....	George F. Conrad.....	Grant
Limon.....	Russell Gates.....	Grant
Longmont.....	L. L. Swenson.....	Grant
Longmont.....	Watts & Hylton.....	Inter-State
Longmont.....	Frank Hildreth.....	Metz
Loveland.....	A. Straight.....	Inter-State
Loveland.....	C. W. Coffman.....	Grant
Manzanola.....	Manzanola Merc. Co.....	Grant
Mattison.....	Kenneth Koontz.....	Metz
Ordway.....	E. W. Cleverly.....	Studebaker
Pueblo.....	Richard Birge.....	Grant
Pueblo.....	Frank Hamilton.....	Metz
Pueblo.....	Guy G. Russell.....	Studebaker
San Luis.....	W. C. Parrish.....	Apperson
Steamboat Springs.....	A. H. Poppen.....	Grant
Sterling.....	Forest E. Felkner.....	Grant
Sterling.....	Ideal Auto & Mach. Co.....	Inter-State
Trinidad.....	J. I. Glendenning.....	Metz
Villas.....	C. F. Wheeler.....	Metz
Walsenburg.....	C. B. Blanton.....	Metz
Wray.....	McGinnis Bros.....	Metz
Yuma.....	O. E. Stimson.....	Grant
CONNECTICUT		
Norwalk.....	F. E. Lockwood & Co.....	KisselKar
FLORIDA		
Jacksonville.....	Seminole Motor Co.....	Stearns-Knight
GEORGIA		
Atlanta.....	E. W. Van Duzen.....	Pullman
IDAHO		
Genesee.....	Joseph Moersch.....	Paige
Kellogg.....	A. P. Hutton.....	Paige
Lewiston.....	William Hollingsworth.....	Paige
Lewiston.....	Lewiston Fuel Co.....	Maxwell
Troy.....	Troy Garage.....	Paige
Vollmer.....	L. J. Esslinger.....	Paige
ILLINOIS		
Colfax.....	E. H. Hager.....	Ford
Elliot.....	Nels Sunnes.....	Herf-Brooks
Freeport.....	M. L. Miller.....	Mitchell
Jacksonville.....	Donald Joy.....	McFarlan
Jacksonville.....	Howard Zahn.....	Cole
Minier.....	Naffziger & Holderly.....	Argo
Murphysboro.....	P. B. Outhouse & Co.....	Oldsmobile
Quincy.....	Machinery & Motor Co.....	Cole
Springfield.....	J. E. Harris.....	National
Springfield.....	Hudson Sales Co.....	Hudson
Springfield.....	C. E. Knecht.....	Chevrolet
Springfield.....	White Garage.....	Oldsmobile
IOWA		
Anamosa.....	Anamosa Auto Co.....	KisselKar
Boone.....	Crow Auto Co.....	Paige
Des Moines.....	Guarantee Motor Co.....	KisselKar
Des Moines.....	H. R. Wells.....	Stearns Silent Knight
Fonda.....	Kenning Auto Co.....	KisselKar
Randall.....	G. P. Christianson.....	Glide
KANSAS		
Junction City.....	Grentner & Sons.....	Dodge
Wichita.....	Regal Motor Co.....	Glide

Town	Agent	Make
Carrollton.....	Thomas Garage.....	King
Louisville.....	Callahan Motors Co.....	White
Owensboro.....	L. D. Baer.....	Ford
MAINE		
Greenville.....	W. H. Daily.....	Chandler
Portland.....	Paterson Garage.....	Allen
MASSACHUSETTS		
Boston.....	W. J. Hurley.....	Pullman
Brockton.....	KisselKar Brockton Branch.....	KisselKar
Malden.....	Parks-Osgood Co.....	Oldsmobile
Medford.....	Medford Hillside Garage.....	Oldsmobile
North Adams.....	M. O. Haggerty.....	Oldsmobile
South Deerfield.....	T. J. Ahearn.....	Oldsmobile
Springfield.....	Springfield-Haynes Auto Co.....	Haynes
Worcester.....	Greene Hale Co.....	Jackson
Worcester.....	H. E. Plimpton.....	Stearns-Knight
Worcester.....	Harry B. Pulsifer.....	King
MICHIGAN		
Adrian.....	Wilson Hardware Co.....	Dodge
Addison.....	Frank Barnaby.....	Maxwell
Grand Rapids.....	B. F. Kenyon.....	Hupmobile
Grand Rapids.....	T. W. & J. J. Jeffery.....	Oldsmobile
Ionia.....	C. H. Walker.....	Oldsmobile
Ionia.....	Benedict Buick Co.....	Dort
St. Johns.....	Steel & Valentine.....	Jeffery
MINNESOTA		
Arlington.....	H. J. Moskop.....	Oldsmobile
Cambridge.....	O. C. Ogren.....	Dodge
Fergus Falls.....	Fergus Auto Co.....	Apperson
Hastings.....	A. R. Walbridge.....	KisselKar
Lanesboro.....	McMaster & Ward.....	KisselKar
Luverne.....	George Forrest.....	Crow
Red Wing.....	A. M. McTiff.....	Studebaker
MISSOURI		
Centralla.....	Louis & H. L. Roemer.....	Reo
MONTANA		
Butte.....	Reynolds, Sypher & Rochester.....	Oldsmobile
Lewistown.....	J. J. Prine.....	Oldsmobile
NEBRASKA		
Cozad.....	W. Robertson.....	Oldsmobile
Hastings.....	Supple Bros. Motor Co.....	Oldsmobile
Hebron.....	W. D. Luttrell.....	Oldsmobile
Lincoln.....	A. H. Meyers.....	KisselKar
Omaha.....	McShane Motor Co.....	Regal
Omaha.....	McShane Motor Co.....	Mercer
Whitman.....	W. J. Abbott.....	Oldsmobile
NEW JERSEY		
Bradley Beach.....	Edward S. Thomas.....	King
Matawan.....	James C. Bushnell.....	King
NEW MEXICO		
Albuquerque.....	F. E. Dearth.....	Metz
NEW YORK		
Buffalo.....	Base Patten Motor Car Co.....	Hupmobile
New York.....	Mineola Garage.....	King
Schenectady.....	William D. Havens.....	KisselKar
Shelter Island.....	George B. Wells.....	King
Silver Creek.....	W. J. Dickerson.....	Oldsmobile
White Plains.....	KisselKar Garage.....	KisselKar
NORTH CAROLINA		
Asheville.....	Asheville Garage.....	Cole
Asheville.....	Asheville Garage.....	Overland
Asheville.....	Asheville Garage.....	White
NORTH DAKOTA		
Plaza.....	John A. Paterson.....	Studebaker
Taylor.....	Richardson Motor Co.....	Buick
OHIO		
Alliance.....	E. R. Coleman.....	Alter
Alliance.....	J. F. Brannon.....	King
Cambridge.....	Cambridge Motor & Storage Co.....	Chalmers
Cleveland.....	Cole-Cleveland Co.....	Scripps-Booth
Cleveland.....	Columbus Cadillac Co.....	Cadillac
Dayton.....	Borchers Carriage & Auto Co.....	Saxon
Dayton.....	Jones & McConnell Co.....	Jeffery
Mansfield.....	Mansfield Garage.....	Hudson
Rayland.....	W. D. Hoge.....	Oldsmobile
South Charleston.....	Sullivan Auto Co.....	Oldsmobile
Toledo.....	Union Supply Co.....	Grant
Sidney.....	Bimel Buggy Co.....	Elco
Warren.....	Morgan-Williams Co.....	Overland
Xenia.....	Page-Maxwell Sales Co.....	King
OKLAHOMA		
Muskogee.....	Hooker-Hendrix Hdw. Co.....	Reo
Oklahoma City.....	Sutton-Johnson Motor Co.....	Mitchell
PENNSYLVANIA		
Germantown.....	Delmar Garage.....	King
Oakmont.....	E. L. Yoerk.....	Maxwell
Philadelphia.....	Allen Motor Philadelphia Co.....	Allen
Philadelphia.....	Baker-Price Co.....	KisselKar
Philadelphia.....	Eastern Motors Corp.....	Standard Eight
Reading.....	Central Motor Car Co.....	King
Warren.....	Bramer Bros.....	Ford
SOUTH DAKOTA		
Sinai.....	F. H. Felberg.....	King
TEXAS		
Dallas.....	J. W. Frawley.....	Reo
Fort Worth.....	G. L. Omohundro.....	Franklin
Fort Worth.....	Wyatt Motor Car Co.....	Studebaker
Houston.....	Houston Regal Motor Co.....	Regal
Marble Falls.....	Marble Falls Garage.....	Oldsmobile
Mesquite.....	Humphreys & Vauston.....	KisselKar
Waco.....	B. C. Nettles.....	Studebaker

Town	Agent	Make
Salt Lake City.....	King Auto Sales Co.....	King
VERMONT		
Brattleboro.....	Mosher & Tucker.....	Oldsmobile
Burlington.....	Odd & Tupper.....	KisselKar
WASHINGTON		
Bonniers Ferry.....	John T. Moore.....	Maxwell
Chevelah.....	Joseph Leur, Jr.....	Maxwell
Colfax.....	S. E. Hunt.....	Maxwell
Colville.....	George L. Ritho.....	Paige
Davenport.....	Field & Co.....	Paige
Edwall.....	Frank Larrable.....	Paige
Harrington.....	E. J. Hatcher.....	Paige
La Crosse.....	John Nietz.....	Paige
Lind.....	E. T. Copp.....	Paige
Malden.....	L. F. Rhider.....	Maxwell
Pullman.....	E. A. Cathcart.....	Paige
Ritzville.....	Bennington-Haight Co.....	Paige
Ritzville.....	Koch & Dewald.....	Maxwell
Ritzville.....	Milea Haight.....	Paige
Spokane.....	Franklin Auto Sales Co.....	Velle
Spokane.....	John Doran.....	Hudson
Spokane.....	Foster-Larson Co.....	National
Tacoma.....	Larkin & Maire.....	Maxwell
Tacoma.....	Manley-Thompson Bros.....	Maxwell
Walla Walla.....	Alvin Corle.....	Hupmobile
WISCONSIN		
Darlington.....	Chapman Garage.....	Chalmers
Eau Claire.....	Reo Sales Co.....	Reo truck
Eau Claire.....	Reo Sales Co.....	Reo
Fond du Lac.....	Johnson Motor Co.....	Chalmers
Hartford.....	Schauer Bros.....	KisselKar
Jefferson.....	Lacey Motor Car Co.....	Chalmers
Kenosha.....	Lux Auto Co.....	Chalmers
La Crosse.....	P. Hofweber.....	Hupmobile
Marion.....	F. J. Haufe.....	KisselKar
Milwaukee.....	R. C. Wrege.....	Pullman
New London.....	E. H. Ramm.....	Ford
Orme.....	Frederick Glines.....	Ford
Racine.....	Modern Garage Co.....	Chalmers
Watertown.....	The Service Co.....	Oldsmobile
WYOMING		
Basin.....	G. R. Hoover & Co.....	Metz
Casper.....	Casper Buick Co.....	Oldsmobile
Dayton.....	R. W. Ratcliff.....	Metz
Sheridan.....	W. C. Reid.....	Grant
FOREIGN		
ARABIA		
Aden.....	Paul E. Slipp.....	Detroit
AUSTRALIA		
Brisbane.....	Richardson, Orr & Co.....	Detroit
Melbourne.....	Richardson, Orr & Co.....	Detroit
Sydney, N. S. W.....	Richardson, Orr & Co.....	Detroit
CANADA		
Montreal, Que.....	Lariviere, Inc.....	Davis
Montreal, Que.....	George M. Primm.....	Ford
Ottawa, Ont.....	Beach Motor Co.....	Chevrolet
Pense, Sask.....	B. J. Thompson.....	Studebaker
Pilot Mound.....	Morden & Graham.....	Studebaker
Portage la Prairie.....	Clark & Guthbert.....	Studebaker
Saskatoon.....	Jackson Auto Agency.....	Studebaker
Wilcox, Sask.....	U. R. Gordon.....	Studebaker
CANARY ISLANDS		
Laguna de Teneriffe.....	Jose Conzavez Rivero.....	Detroit
CHILE		
Santiago.....	Teodore Hubenbacher.....	Detroit
CUBA		
Cardenas.....	Roque E. Garrigo.....	Detroit
ENGLAND		
Birmingham.....	Bell, Johnson & Co.....	Detroit
FIJI ISLANDS		
Suva Island.....	A. M. Brodzia.....	Detroit
FINLAND		
Helsingfors.....	F. S. Forsgren.....	Detroit
FRANCE		
St. Cloud.....	J. Guindley.....	Detroit
Seine et Oise.....	J. Guindley.....	Detroit
GREECE		
Athens.....	Panaghy D. Vyrenis.....	Detroit
HOLLAND		
Arnhem.....	Van Dam Van Polanen & Co.....	Detroit
ICELAND		
Reykjavik.....	G. Eide.....	Detroit
ITALY		
Reggio-Emilia.....	Bedeschi & Bertolotti.....	Detroit
NEW ZEALAND		
Wellington.....	Richardson, Orr & Co.....	Detroit
NORWAY		
Christiania.....	J. Molbach Thellefsen.....	Detroit
PANAMA		
Panama Rep.....	Herbert M. Campbell.....	Detroit
TAHITI		
Papeete.....	Hintze & Johnson.....	Detroit
PORTO RICO		
San Juan.....	Pietrantonio & Sojo.....	Detroit
PORTUGAL		
Anadia-Sangalhos.....	Duque, Silva & Co.....	Detroit
RUSSIA		
Petrograd.....	D. J. Borowsky & Raulnat.....	Detroit
SPAIN		
Almeria.....	E. Viciana & Viciana.....	Detroit
SWEDEN		
Linkoping.....	Svenska Cykel-Magasinet.....	Detroit

COMMERCIAL CARS

Town	Agent	Make
Hamilton, Ont.....	Wollung & Carroll.....	Autocar
Montreal.....	Victor Levesque.....	Knix
Ottawa, Ont.....	W. C. Cregg.....	King
Toronto, Ont.....	Dominion Automobile Co.....	Autocar
Vancouver, B. C.....	Ingwall & Cotts Co.....	Vim
COLORADO		
Denver.....	Arthur C. Wagner.....	Denby

Town	Agent	Make
Los Angeles.....	Stone-Dancy Motor Sales Co.....	Kelly-Springfield
CUBA		
Havana.....	Latin-American Trading Co.....	Autocar
MINNESOTA		
Minneapolis.....	L. H. Smith.....	Stone trailer

Town	Agent	Make
Auckland.....	Chandler & Co.....	Autocar
PANAMA		
Ancon, C. Z.....	O. M. Ewing.....	Autocar
PORTO RICO		
San Juan.....	H. Clyde Gregory.....	Autocar

"I'm ashamed to be seen getting into such a shabby car. Why don't you polish it with Johnson's Prepared Wax? We've used it on the floors and furniture for years."

Keep Your Car Like New with **JOHNSON'S PREPARED WAX**

It forms a thin, protecting film over the varnish adding years to its life—it covers up mars and scratches—prevents checking, and imparts a perfectly hard, dry, glass-like polish which

Will Not Gather Dust

Johnson's Prepared Wax polishes and finishes in one operation. It is in paste form—clean and easy to use and economical. It is conveniently put up—always ready for use—no tools or brushes required—all you need is a cheese cloth rag.

"Sheds Water Like a Duck's Back"

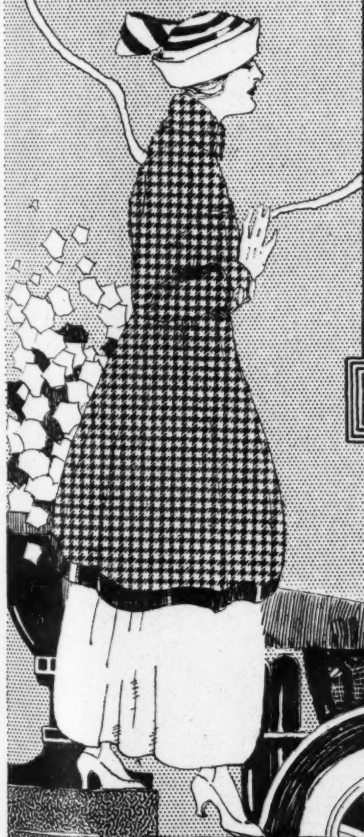
The heaviest rain will not dim the mirror-like polish that Johnson's Prepared Wax gives your car. Use it also on your wind shield for clear vision and on the leather upholstery—it livens it up and acts as a preservative.

Makes a Wash Last Four Weeks

Johnson's Prepared Wax is a boon to the man who takes care of his own car. The tiresome task of washing is reduced to the minimum. One user writes us, "It makes a wash last four weeks instead of one." An occasional application will keep your car like new, increase its market value, and give you the prestige that follows the appearance of prosperity and class.

Send 60c for 1 pint by Parcel Post prepaid—enough for a season's use—or mail coupon for a trial can—sufficient for one polish on a large car.

**S. C. JOHNSON & SON
RACINE, WIS.**



S. C. JOHNSON & SON, Racine, Wis. MA
I enclose 10c for a can of Johnson's Prepared Wax—sufficient for one polish on a large car.

Name.....
Address.....
City and State.....
My Accessory Dealer Is.....



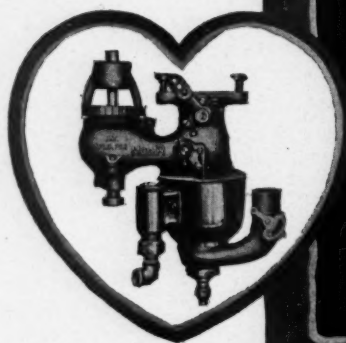
That Schebler holds practically every world's motorcycle record from 1 to 100 miles—and has won every important motorcycle road race this year, adds but one more to an already long list of carburetor achievements.

All 'Round Champion Carburetor

Schebler dominates wherever gasoline furnishes motive power for motor car, aeroplane, motor cycle, motor boat or submarine

Look for Schebler on your new car—install Schebler on your old car

WHEELER & SCHEBLER
Indianapolis, Indiana



"Van" service reaches the world over. The agency from which you purchased your "Van" equipped car operates a service station for your convenience.

Every agent here and abroad who handles the "Van"-equipped car you drive also stands ready, should the occasion arise, to make any replacements necessary.

Bracket Type

"Van" for Ford cars—\$12.00, complete with standard type of front wheel drive.

The VAN SICKLEN COMPANY

GENERAL OFFICES:
14 Chicago St., Elgin, Ill.

FACTORY:
Elgin National Watch Co.

Factory Representatives:
Cutting, Armstrong &
Smith Sales Co., Detroit,
Mich., for the States of
Michigan, Ohio and Indiana

General Distributors: The
Beckley-Ralston Company,
Chicago

Eastern Distributors: A. J.
Picard & Co., 1722 Broad-
way, New York City

Foreign Distributors: Mestre
& Blatge, 20 Store St.,
Tottenham Ct. Rd. W. C.,
London, England

"Van"

The
Speed-
meter
with the
Big
Black
Figures



Flush type
with nickel
bezel. Price, \$25.00.

A Great Conference Of Interest to All Tire Users And Dealers

Once every year all Firestone salesmen meet at our Akron headquarters.

At our first annual meeting only thirty men were present; this year, September 28th, 29th and 30th, over three hundred were present from all parts of the United States and several foreign countries.

Besides attending the general sessions addressed by the Company executives, branch managers and salesmen, every representative spent hours in the factory studying, in a practical way, the manufacture of Firestone tires. They saw Firestone experts building in the "extras" you have been reading and hearing about; that extra layer of fabric in the five-inch tire; the extra ply in the three-inch; the extra coating of pure gum between the plies, etc. They saw the "inside" reasons why 50 per cent more Firestone dealers were added last year, and why our output was increased 78 per cent.

They saw five great buildings under construction to provide over seven

acres of additional floor space which will increase the Firestone output of pneumatic tires from 7,500 to 12,000 a day. This increase of 4,500 tires per day is larger than the output of the original new Firestone plant erected on its present site four years ago.

They rubbed shoulders with hundreds of men whose interests are kin to theirs, and from them they reaped a great harvest of valuable and helpful information which they will use to the advantage of customers.

These days of conference and study represented a large investment, but it will produce adequate dividends in better service for tire users the world over. It will mean a greater, more alert, better informed Firestone organization, and that insures satisfied customers. And there you have the vital reason for it all because—satisfied customers constitute the corner stone of the Firestone business.

FIRESTONE TIRE AND RUBBER COMPANY

"America's Largest Exclusive Tire and Rim Makers"

AKRON, OHIO—Branches and Dealers Everywhere

Firestone

STROMBERG

Hangs Up
Another
Record!



Twenty-seven and one-half miles on one gallon of gasoline over the boulevards of Chicago on a day when the barometer was low—27½ miles on wet pavements against a strong wind and rain—all on one gallon of gasoline.

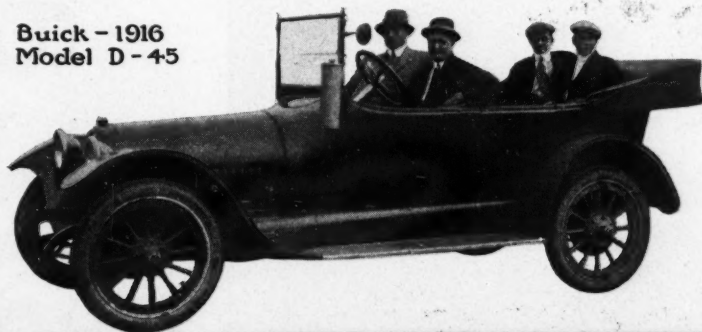
That's the remarkable economy record set by the New Stromberg Carburetor on the 1916 Model D-45 Buick, in a test which was officially observed by F. E. Edwards, technical representative of A. A. A. Sept. 16th. More conclusive proof of the economy of the wonderful New Stromberg Carburetor.

The car with passengers weighed 3590 pounds and without touching the New Stromberg Carburetor, made the two-mile lap of the Chicago Speedway in the amazing time of 2:82/5. On this same lap a speed of 61 miles an hour was attained—more Stromberg Service.

From a standing start, the car was accelerated to 30 miles per hour, running through gears, in exactly 11.5 seconds. Then from 5 miles per hour in high, it was speeded up to 25 miles per hour in 12 2/5 seconds.

Give us the name, model and year of your car, and we will tell you which New Stromberg Carburetor will increase its flexibility, power, speed and economy.

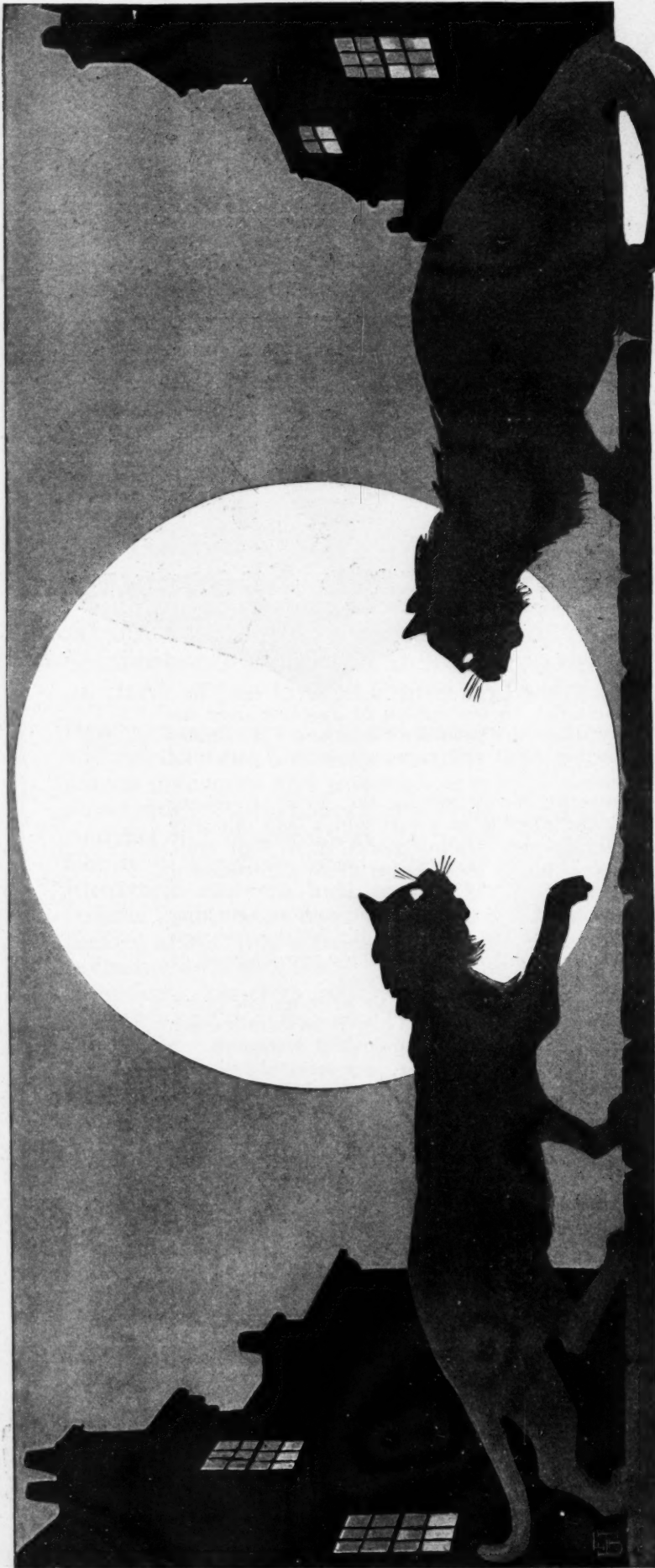
**Buick - 1916
Model D - 45**



New STROMBERG Does it! **CARBURETOR**

Stromberg Motor Devices Co., Dept. G., 64 E. 25th St., Chicago

When Writing to Advertisers, Please Mention Motor Age



Balzac said—"In the
dark all cats are grey."

When Writing to Advertisers, Please Mention Motor Age

Sept
It's much the same with spark plugs. They will all

It's much the same with spark plugs. They will all probably seem alike to you until you've tried

JUMBO SPARK PLUGS



Jumbo double-electrode construction insures a hot, snappy spark every shot.

Test Jumbo Jiant for Yourself

If you are a dealer, write us on your own letter head, and we will send you a plug for trial. Test it out under the most severe conditions you can think of. If it doesn't fully prove its absolute superiority over every other plug made in America we won't request your future business.

Ask also for descriptive circular, prices and quantity discounts.

Gibson-Hollister
3380 Washington Street

Manufacturing Company
Jamaica Plain, Mass.

—and then you'll realize what a difference there really is.

A Jumbo Plug simply cannot be fouled by an excess of lubricating oil—any oil splashed against the shell electrodes must run down and away from the sparking point.

Porcelain breakage, due to the hammer-like blows of explosion, is avoided by use of big, elastic copper-asbestos washers, spaced much farther apart than in the usual construction. An extra central insulator insures continuity of spark in case the porcelain should ever by any chance be cracked or broken.

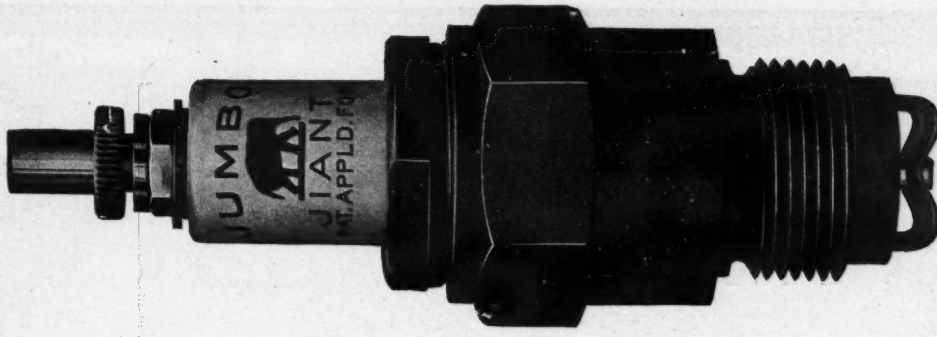
The Universal Terminal

supplied on Jumbo Spark Plugs, gives perfect electrical contact with plain, Q. D. or slip terminals. This means that the dealer needs to carry in stock only a third as many plugs to meet all requirements. Moreover, every Jumbo Plug which leaves our works carries with it

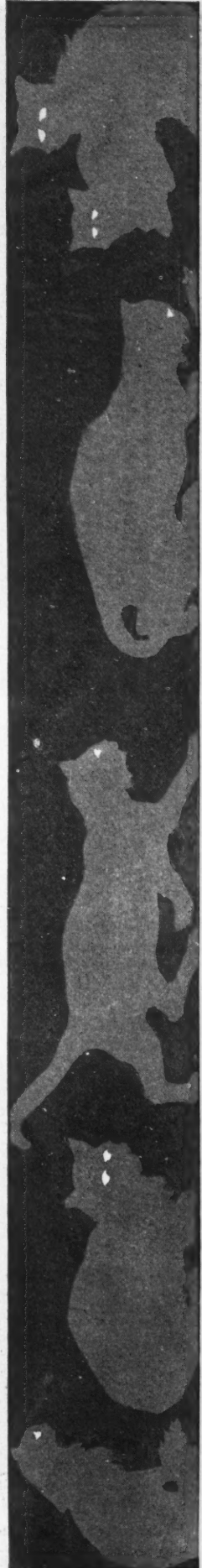
The Jumbo Guarantee

which means precisely this—if at any time within one year of purchase a Jumbo Spark Plug develops any defect; or in any way falls down on the job, we will give the purchaser a new one without one word of argument or one cent of additional cost.

The Jumbo family is a lusty one. It includes Jumbo Jiant, shown on this page, our big leader, made in S. A. E. standard, half-inch, metric and Buick Special sizes; Jumbo Regular, made in S. A. E. standard, half-inch and Overland Special sizes; Jumbo Junior, made in S. A. E. standard, half-inch and motorcycle special sizes; and Jumbo Special for Fords.



60-13



Consider SAFETY Not Price

YOU gamble with personal safety and risk your car when you use "cheap" tubes.

Can you afford to take a chance even on the loss of a tire, let alone serious injury to yourself and others or even risk wrecking your machine?

Blow-outs, due to faultily constructed tubes and low grade materials have put many cars in ditches or otherwise caused their disabling.



There are two ways to make an inner tube—one, the old crude machine method, using a single thickness of material; the other the **QUAKER** way of building up multiple plies of thin rubber, then "fusing" them into a thick wall.

To the most modern method of construction we add the finest rubber, **TEMPERED** by our secret formula and exclusive process—a combination that means prevention of air leakage and gives the tubes maximum tensile strength.

If you value your own safety, your car and your tires, you will use

QUAKER Tempered Rubber TUBES

QUAKER TUBES can be bought direct from our factory or nearest distributing station, if your local dealer has not yet stocked the goods. Give us your dealer's name and address when you write. Mark your letter: "Personal attention: Mr. Lyons."

Dealers should ask about our "Square-Deal" Policy. Address Mr. Moore.

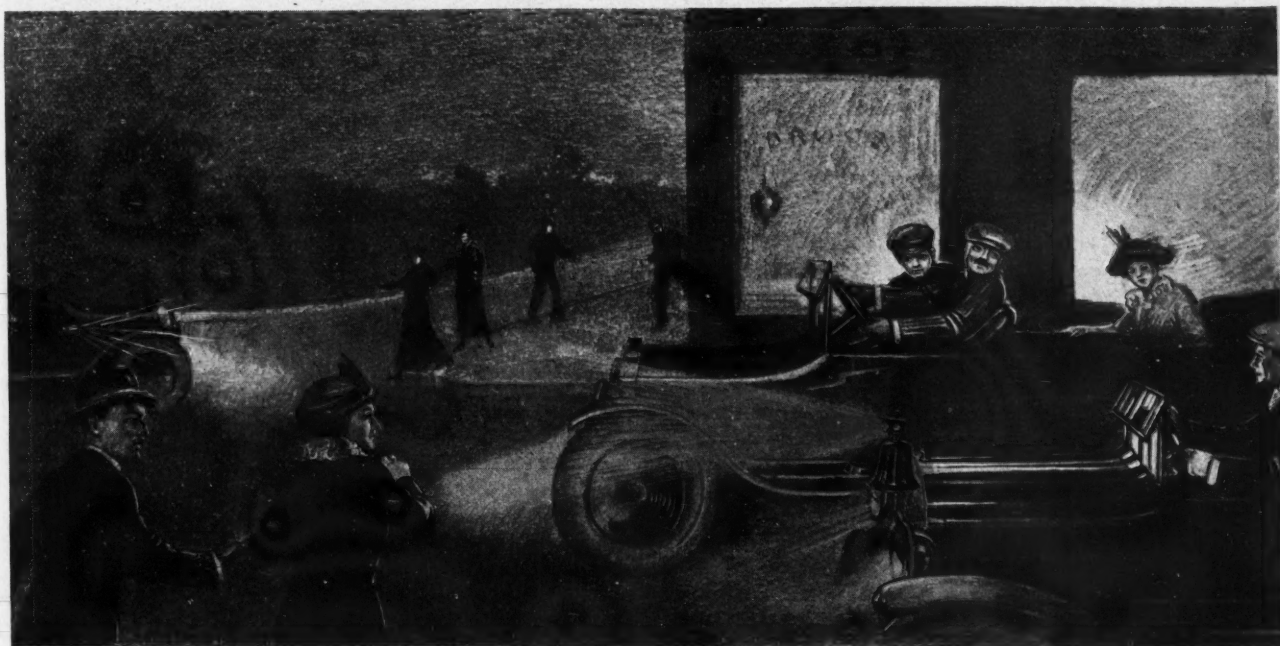
QUAKER CITY RUBBER CO.

Factory and Home Office **PHILADELPHIA**

CHICAGO
182 West Lake St.

PITTSBURGH
211 Wood St.

NEW YORK
207 Fulton St.



Realization of Signal Efficiency

The "Liberty Bell"

A Real Warning Signal

200 Per Cent Efficient

THE "Liberty Bell" is an advanced type of warning signal for automobiles, giving a red flash through prismatic lenses, together with clear penetrating bell tone, electrically operated, using one-fifth the current necessary to operate a horn.



Bells range in price, according to size and equipment, from \$5.00 to \$14.00.

THE "Liberty Bell" is 200% efficient, conveys its message to both eye and ear, makes night driving safe and gets the way without offense.

THE "Liberty Bell" is strongly made and handsomely finished, with clear, mellow tone. Insistent in its demand for "right-of-way."

Just what the motorist wants

Not mere noise, but combining the two standard warnings used where signal efficiency is vital.

The enthusiastic approval of hundreds of discriminating automobile owners and the repeat orders of dealers now handling same, prove to us that you, too, can add to your profits by handling this "good seller." Place an order with us now. The "Liberty Bell" is fully sanctioned by underwriters, police and councils.

We have a liberal proposition. Write today.

The Liberty Bell Company, 401 to 428, The Arcade, Cleveland, O.

Policy

Policy is the background of progress, the basis of commercial success. Scripps-Booth policy stands for continual advancement and betterment irrespective of price, and has nothing in common with the present frenzied cutting of motor car prices, which in the face of rising labor and material costs can mean but impoverishment of quality and impairment of value.

Scripps-Booth products will always be built up to a standard of highest quality and never down to a basis of price. Spectacular announcements of so-called new yearly models at greatly reduced prices have been used as an unnatural means to stimulate sales. That this results in an immediate and unwarranted depreciation in the market value of every owner's car at the time the new announcements are made is easily seen. Such cars become at once out of date.

Manufacturers of the most famous and successful cars owe their success to a better policy. The world-wide prestige of such concerns as the Rolls-Royce, the Isotta Fraschini, Renault, Mercedes, De Dion Bouton et cetera, rests on the continuous introduction of well-developed improvements; not on the sudden adoption of accumulated changes. Master products cannot be rushed up to date in a few weeks and made perfect by loud announcements. Such can only be maintained in their class by engineering skill and continual effort. This is the reason for maximum performance and highest resale value.

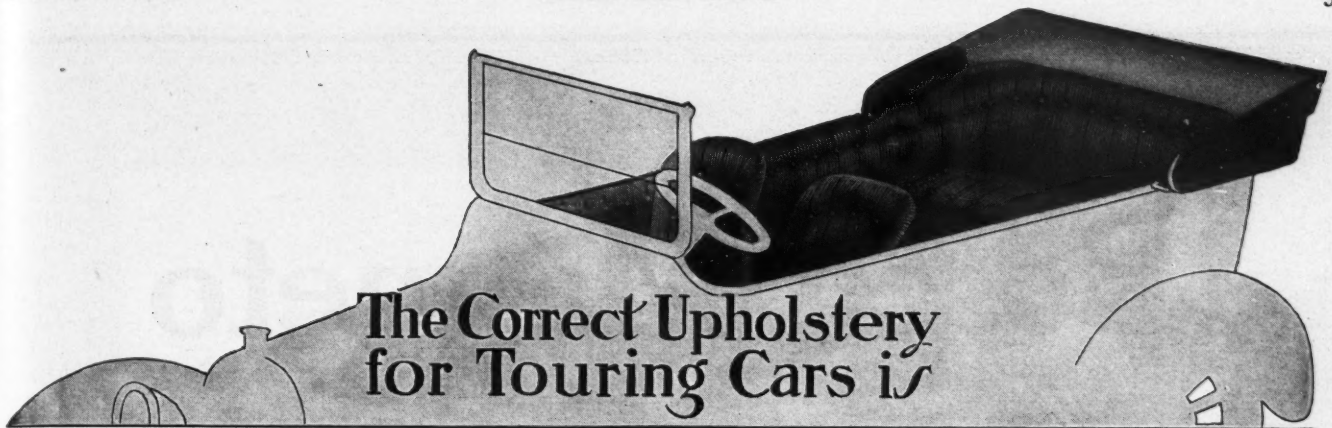
The Scripps-Booth Company believes that the policy which will best protect the interests of Scripps-Booth owners is the policy that will best maintain the reputation of Scripps-Booth cars. To such a policy will the Scripps-Booth Company strictly adhere. Its object is to produce the smartest looking and easiest riding roadster it is possible to build, which shall be efficient in construction and perfect in operation — a pride alike to those who buy the car and those who sell it.

We will take no part in the frenzied slashing of prices now in vogue, believing it unsound in principle and unfair in practice. We refuse to impair the quality for 1916; we strive conscientiously to improve it; we cannot, therefore, reduce the price.

Scripps-Booth prices always will be consistent with the standard of quality which this firm insists upon as its foundation of growth.

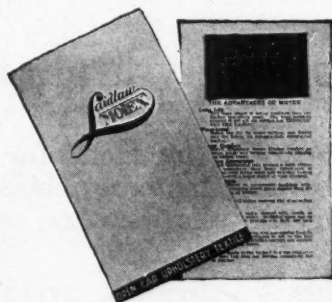


Scripps-Booth Co.
Detroit, Mich.



MOTEX

THE correct upholstery for touring cars is "MOTEX," a woven textile designed and constructed to meet all the requirements and abuses of touring car and convertible body upholstery. "MOTEX" should not be confused with ordinary cloth upholstery, such as is used in limousines, electric cars or horse drawn vehicles.



We have prepared an instructive and interesting booklet describing in detail the features and advantages of "MOTEX" Upholstery for touring bodies. We will send you this booklet if you request it.

The **Laidlaw**
Company Inc.
New York City

Bosch Magneto Ignition

Is used by all these
prominent drivers be-
cause Bosch is reliable

D. Resta
E. O'Donnell
E. Rickenbacher
L. Chevrolet

R. De Palma
R. Burman
B. Oldfield
W. Orr

G. Anderson
T. Alley
R. Mulford
R. Ruckstell

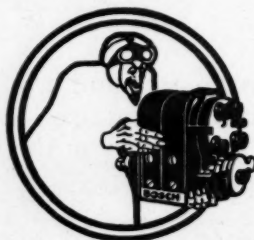
E. Cooper
E. Pullen
H. Grant
E. Tetzlaff

THERE is no difference of opinion among these close students of the motor car. They have adopted Bosch Magneto Ignition without question, not only because Bosch is more speedy, not only because Bosch is more capable, but mainly because Bosch Magneto Ignition is

—Absolutely Reliable—

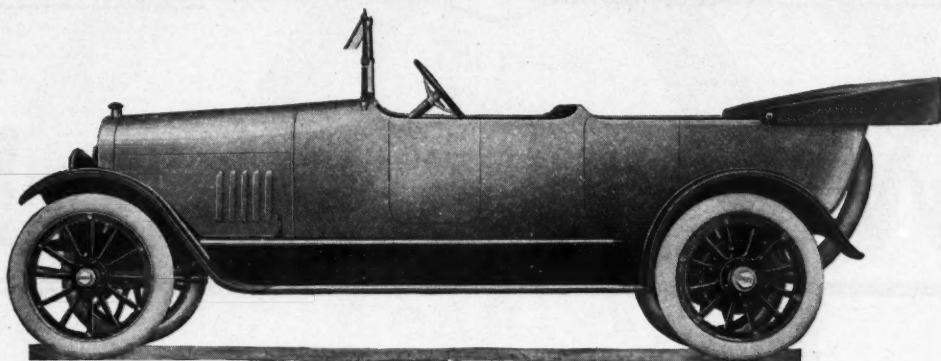
A broad statement, but proved by facts; for not a single driver in any of the big contests of 1915 experienced a moment's trouble with his magneto during the terrific pace set by the leaders.

Bosch Magnetos hold
all the new racing
records of 1915



If you want Reliable
Ignition, Be Satisfied
Specify Bosch

BOSCH
214 W. 46th St.
N. Y.



ENGER TWIN SIX

12 Cylinder

\$1095

Territory Is Going Rapidly—

This is the first popular priced Twelve.

Thousands of dealers want to represent it.

Factory demonstrations are going on now.

Come down, or wire us when you will, at once.

Drive this new Twelve yourself.

*Twin Six—12 Cylinders
2 $\frac{5}{8}$ " bore x 3 $\frac{1}{2}$ " stroke*

*Valve-in-head motor
Cantilever springs*

*115-inch wheelbase
Pure stream line body*

*Electric lights and starter
Complete in every respect*

Literature on request

The Enger Motor Car Co., Cincinnati, Ohio

FOSTER OWL LIGHT

Who-o-o-o!

After a most thorough investigation of the searchlight problem on the part of our Engineering Department, we are pleased to announce a new and improved FOSTER Owl Light at a new price, \$7.50. Designed after a searchlight of far-carrying power in use by the French army, the new OWL is undoubtedly the most scientific lamp of American construction obtainable.

With its specially designed FOSTER Universal Swivel, this light can be quickly and easily turned in any required direction. A common trouble of many lamps—that of toppling over, hanging head down and out of reach in an emergency—has been most effectively eliminated by this new swivel. The worst jolting and jarring to which a car is subjected cannot cause an OWL to budge a fraction of an inch. The only means by which the FOSTER Owl can be turned is by use of the driver's hand.

The new FOSTER Universal Bracket with which this light is equipped, makes possible quick installation on the windshield of any car. No extras or special fittings are required.

A new type of bayonet lock lens does away with all unsightly projections on the face of the lamp and makes for an especially pleasing, symmetrical, clean-cut appearance.

The new OWL will throw as powerful and far-reaching a light as much larger lamps, due to the carefully thought-out design of its silver reflector. A FOSTER Nitrogen Tungsten bulb is used, insuring 50% more power than ordinary bulbs, the use of less current and long life in service.

Operates from storage batteries or dry cells. Attaches to windshield of any car, or may be attached to car body if desired.

In Ordering State Make and Model of Car, and Battery Voltage

Demand the genuine FOSTER Owl Light. Look for the little owl on the name plate on the back of the lamp handle. Accept no substitutes.

The NEW
Model that

Fits on
Any Car

\$7⁵⁰



Furnished complete with bracket, 3-ft. cord, two sockets, ready to put right on. Handsomely finished in black with nickel trimming.

Get your OWL now and avoid the inconveniences caused by the limited field of your headlamps. One accident avoided and the OWL Light has paid for itself.

Write for handsomely illustrated free booklet. Send for free catalogue of FOSTER accessories.

Dealers: One dealer has already sold 165 OWLS at the new price and ordered 200 more. Our advertising in every prominent motor car paper is stirring up a tremendous volume of business for you. Get your share! Write for interesting proposition.

C. H. FOSTER

Manufacturer and Distributor of
Motor Car Accessories

2303 Michigan Ave., Chicago, Illinois

If you understand mechanics you will understand these rings.

Guaranteed to be better rings—or your money refunded.

Patented
May 15
1915

← Open

→ Closed

Patented
May 15
1915

Engineers claim them to be simplest, most practical.

Your motor is only half-efficient without them.

Increase
Power
Use Less Oil
**McCADDEN
Leakless
PISTON
RINGS**
Prevent Carbonization
Decrease Friction
Attain Higher Speed

**WHY
?**

DID you ever consider that among all the piston rings on the market there must be ONE ring whose design best proves the leakless principle?

Everybody knows that almost any so-called non-leaking piston ring is better than the old style piston ring which it is fast superseding. The question for you is to get the most efficient non-leaking ring. So investigate before you invest!

Compare McCADDEN Leakless Piston Rings in any way you wish. Note that they are absolutely simple—just two eccentric rings placed one within the other and locked.

Imagine both sections of this ring straightened out and you have two strips of metal tapering at each end much like the leaves of a motor car spring.

These two tapered circular strips bend evenly from tip to tip—hug the piston head like a leech, eliminating any possibility of flat spots resulting from springing the ring into position.

And the Joint—it is physically impossible for gas to work its way past it. The inner ring acts as an impervious check.

In point of durability these rings have no superior.

Start getting full motor efficiency today. Install McCADDEN Rings. Obtainable at your dealer's, or direct. Look for the name "McCADDEN Leakless" stamped on every ring. Accept no substitute. Write for full information.

McCADDEN MACHINE WORKS ST. CLOUD MINNESOTA

American Distributing Co.

FACTORY REPRESENTATIVES

DETROIT

MICHIGAN

Maxim Silencer

Mufflers

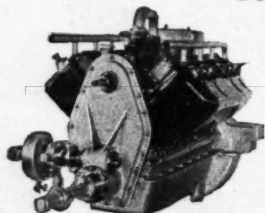
Maxim Silencer Co.
Hartford, Conn.



Radiators

National Can Co.
Detroit, Mich.

Herschell-Spillman Company



Motors

"Eights"
"Sixes"
"Fours"

N. Tonawanda, N. Y.

K-B Universal Joints

KINSLER-BENNETT CO.
HARTFORD, CONN.

American Gear & Manufacturing Co.

AXLES

Front and Rear
JACKSON, MICH.



BARNES GEAR COMPANY

Steering Gears

OSWEGO, N. Y.

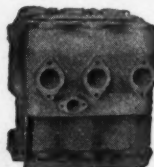
MUNCIE GEAR WORKS



MUNCIE, IND.

Transmissions

SOWERS
MANUFACTURING
COMPANY



High Grade Cylinder Castings

Buffalo, N. Y.

Ready-Made Market

THERE is a *Ready-Made Market* for the Stewart Magnetic Type Speedometer for FORD cars, because every FORD owner is proud to have a Stewart.

You'll sell Stewarts, hand over fist, without having to take time and effort explaining what the goods are, as you would with others.

You don't have to risk your reputation. You don't have to put *your* guarantee behind the Stewart. You don't have to spend the time and thought of *your* salespeople trying to make FORD car owners willing to accept the Stewart. There are no comebacks of any kind.

These are things you'll surely be up against if you try to sell obsolete and untried speedometers that have *no market*, except what you would make for them by the sweat of your brow—all for a possible twenty-five pennies' extra profit—and at the *risk* of forever *losing* a good *car customer*. Think it over!

Stewart Speedometer
MAGNETIC TYPE
for FORD Cars - \$12



Stewart-Warner Speedometer Corporation, Chicago, U. S. A.

DODGE BROTHERS MOTOR CAR

On almost every road in the country the sturdiness and steadiness and unusual comfort of the car have been fully demonstrated.

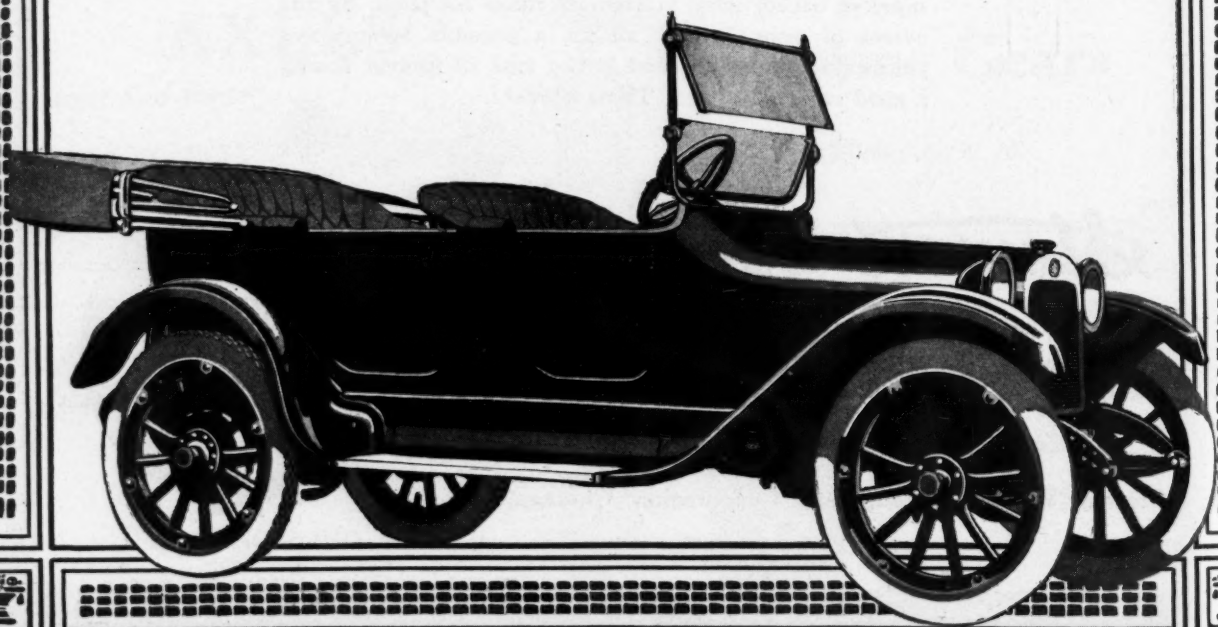
Steep hills, desert sands, rough roads or mud roads have held no terror for it. It has done everything it has been asked to do, and many things that have been called remarkable.

The motor is 30-35 horsepower

The price of the Touring Car or Roadster complete
is \$785
(f. o. b. Detroit)

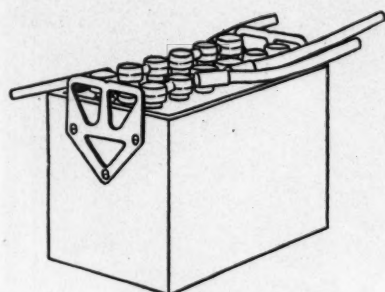
Canadian price \$1100 (add freight from Detroit)

DODGE BROTHERS, DETROIT

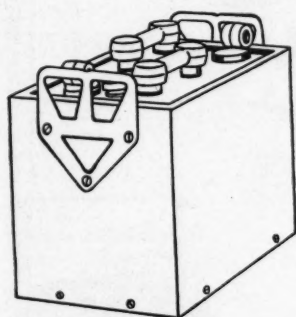


When Writing to Advertisers, Please Mention Motor Age

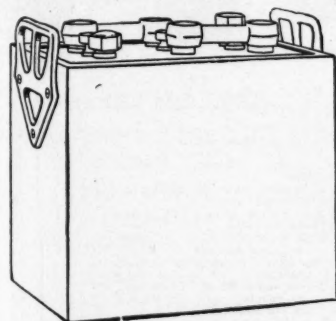
***We Build Detroit
Batteries to Fit
Any Car or Starter***



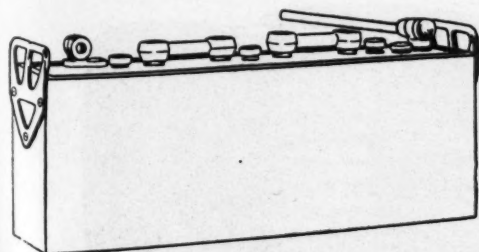
Maxwell Type



Studebaker Type



Buick Type



Overland Type

50 Per Cent Reduction in List Prices

That's the first sensational move in our campaign to bring the merits of **Detroit Batteries** home to automobile owners.

Dealers selling **Detroit Batteries** can supply any car in their community. **Detroit Battery** prices are net and marked plainly to mean what they say. The improved quality of the **Detroit Battery** places it in a class by itself.

Detroit Batteries are the result of over thirty-five years of experience in battery building. The men in our organization were associated with the inventor and producer of the first successful commercial storage battery.

DETROIT BATTERY cells are tested with 30,000 volts.

DETROIT BATTERY grids are cast in our own plant.

DETROIT BATTERY oxides are blended as only life-long experience can blend.

Every carboy of acid is thoroughly tested.

Every gallon of water used we distill ourselves.

DETROIT BATTERY boxes are of the finest woods.

Detroit Batteries are proven by the tests of engineers to be first in capacity, first in capacity for weight, and first in reliability.

Our Dealers' proposition is unequalled. **Detroit Battery** dealers can get and hold the trade of every car owner in their territory.

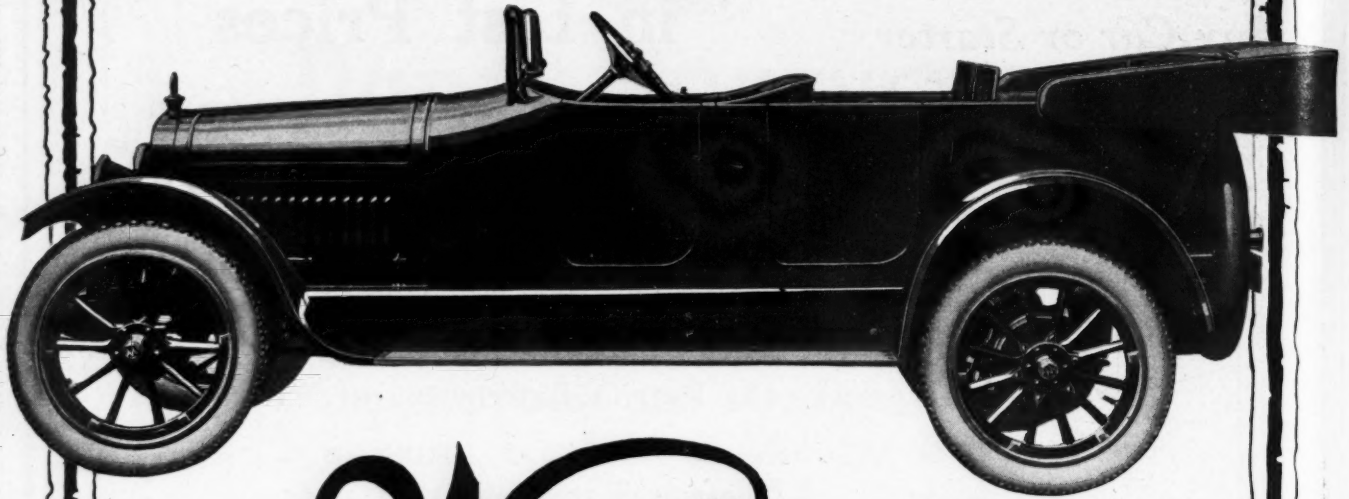
Write for full particulars

Detroit Battery Company
Detroit, Michigan

Regular Equipment on Argo, Crow, Princess, Mecca, Moore, Monitor, Niagara, Denby Truck, Disco Ford Starters, and others.



Built to Endure.



Westcott

1916 Sixes

To build the finest automobiles of the light weight tendency in the world is one thing—to tell you about them in print is nigh impossible.

We go on record though as saying to you, that never in your experience have you seen such elegance, such substantiability, such motor car desirability at such moderate prices as we offer you in the 1916 WESTCOTT Sixes.

Perhaps we are not telling you anything new, because the fame of the 1916 WESTCOTT Sixes has already traveled far—

At all events, know the WESTCOTT thoroughly—know the supreme motor car value of Nineteen Sixteen. It will be a revelation to you.

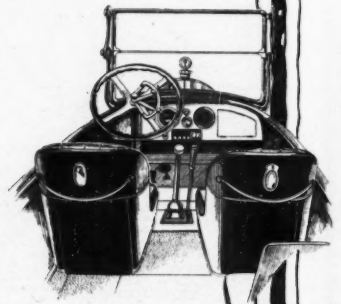
Six-41—5 Pass.	41 H.P. Touring.	\$1295
Six-41—3 Pass.	41 H.P. Roadster.	\$1295
Six-41—3 Pass.	41 H.P. Cabriolet.	\$1595
Six-51—7 Pass.	51 H.P. Touring.	\$1595
Six-51—3 Pass.	51 H.P. Roadster.	\$1595

Immediate delivery

Westcott Motor Car Co.

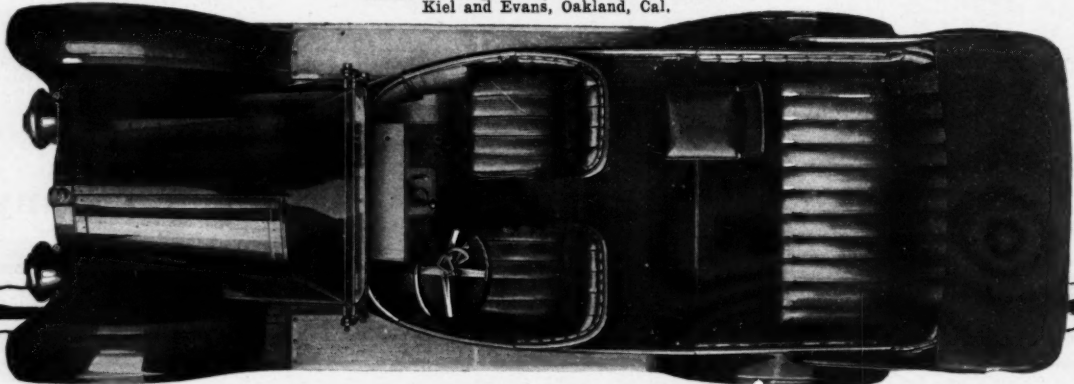
1125 North E Street Richmond, Indiana, U. S. A.
Exhibit in Transportation Bldg., Panama-Pacific International Exposition, in charge of Messrs.
Kiel and Evans, Oakland, Cal.

More than ample leg room in driver's compartment.
Centre-aisle front seats.
Completely disappearing auxiliary seats.
Firestone Non-Skid and Kelly Springfield Kant-Slip over-size tires on all four wheels.
Gemmier irreversible worm and sector steering gear.
Standard Delco Starting, Lighting and Ignition system.
Stewart Vacuum Gasoline system.
Timken front and rear axles.
Timken bearings in all four wheels.
Timken bearings in worm bevel differential.
Fedders genuine cellular radiator.
Dry plate multiple disc clutch.
Six-41—Wheel Base 120 in.
Six-51—Wheel Base 126 in.



Rayfield Carburetor bolted direct to cylinder block without manifold.
WESTCOTT Continental standard six cylinder motor.
WESTCOTT Cantilever rear springs. Chrome vanadium steel.
Firestone quick detachable, demountable rims.
No. 1 long grain, full, bright enamel leather.
Patented WESTCOTT upholstery—no buttons.
Two-bulb construction headlamps.
Finest cowl-fitting, water-tight, rain-visor and double-ventilating windshield.
Genuine Pantasote one man top.
Jiffy curtains, and twenty other distinctive WESTCOTT Superiorities.

Six-41—Weight 2800 lbs.
Six-51—Weight 3000 lbs.





National Rubber stretched
to Nine Times Its
Own Length

The thickest
and toughest
pure rubber
tube made.

Proof!

THE SUPERIORITY OF NATIONAL "SPECIAL" RED TUBES IS NOT MERELY
A MATTER OF ADVERTISING CLAIMS
IT CAN BE DEMONSTRATED!

IN a good tube toughness and lasting elasticity are vitally important. But to be elastic and full of life a tube must be made entirely of high-grade, pure rubber—reclaimed rubber and rubber substitute can be used to cheapen the price of a tube, but it shortens its life materially.

The illustrations at the top of the page illustrate graphically the truth of our claims,

We have told you over and over in our advertising that NATIONAL Tubes are made entirely of the finest rubber stock—Up-River Fine Para.

Let us see what this means. In elasticity tests the rubber in ordinary stock National "Special" Tubes shows ability to be stretched to nine times its own length and then return to its original shape. On the same test the rubber in a tube made of ordinary, inferior stock will stretch to only about five times its length and will not return to its original size.

This superiority in stock to begin with is only one point in NATIONAL superiority. Add to this the careful laminated construction, the special vulcanizing process, the valve patch as an integral part of the tube, and our guarantee against leakage and deterioration for one year and the logical answer is

"BUY NATIONALS"

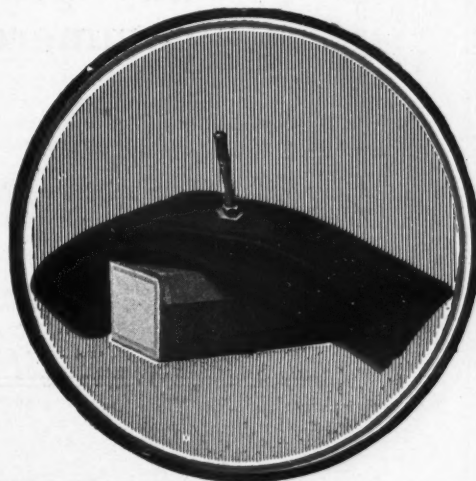
National Rubber Company

New York
J-M Shock Absorber Co.
250 West 54th Street

Factory and Main Offices:
Pottstown Pa.

Philadelphia
J-M Shock Absorber Co.
210 South 17th Street

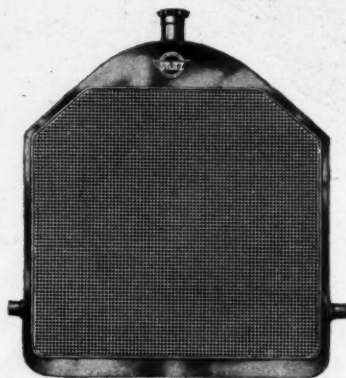
Size	Price	Size	Price
28x3	\$3.10	36x4	\$ 5.90
30x3	3.20	37x4	6.10
30x3 1/2	4.10	34x4 1/2	7.10
31x3 1/2	4.25	35x4 1/2	7.25
32x3 1/2	4.40	36x4 1/2	7.50
34x3 1/2	4.70	37x4 1/2	7.75
36x3 1/2	5.00	38x5	8.50
31x4	5.20	36x5	8.70
32x4	5.30	37x5	9.00
33x4	5.50	39x5	9.50
34x4	5.65	37x5 1/2	10.30
35x4	5.75	38x5 1/2	10.50



Dealers: Write for territorial proposition, terms, discounts, etc. Address sales manager.

When Writing to Advertisers, Please Mention Motor Age

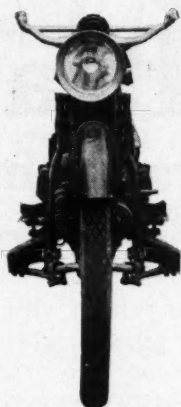
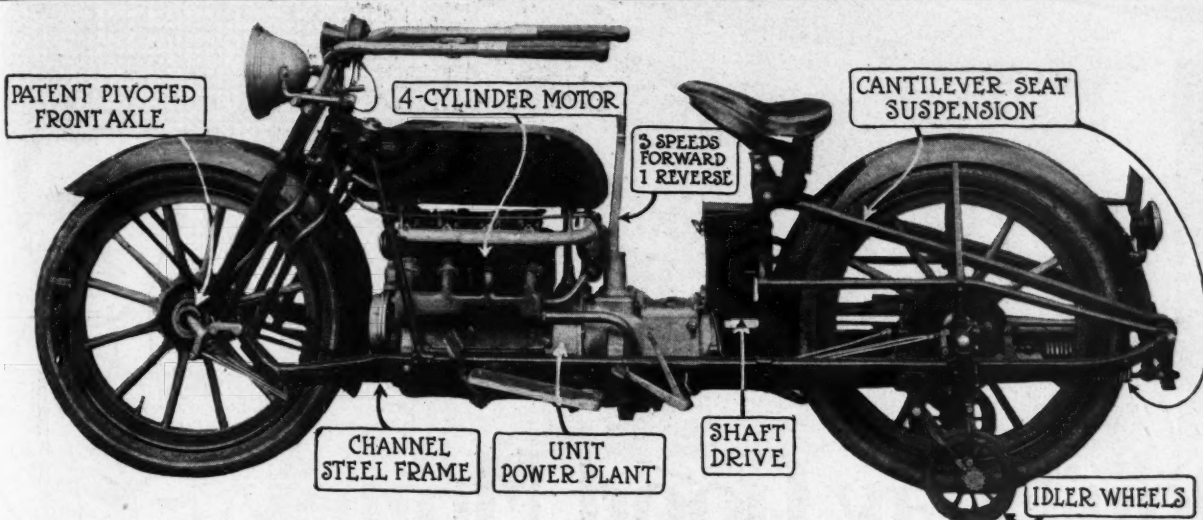
Fedders Radiators



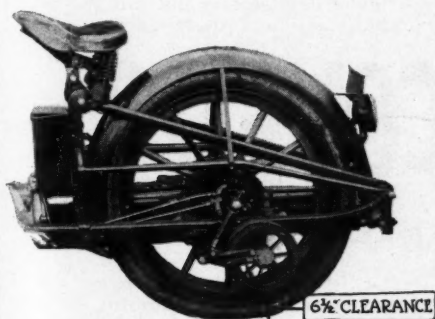
FEDDERS Radiators are as good for their purpose in a car's make-up as the best motors—the finest gears—most effective ignition, etc., are for their functions.

This has been proven in trans-continental endurance tests—the foremost speed contests—in every day pleasure car usage and in commercial service.

Fedders Manufacturing Co., Inc.
Buffalo New York



Pivoted front axle makes possible adoption of underslung frame. Note perfect symmetry.



Idler Wheels, raised or lowered instantaneously from driver's seat, make it possible to stop, start, reverse, go slow or fast, without leaving the seat or taking the feet from the running board. With the self-starter this equipment makes the MILITAIRE AUTOCYCLE as easy and desirable to operate as any motor car.

Cantilever Springs, front and rear, make for touring car comfort.

The 2-Wheeled Automobile

For those who drive a large car yet desire a light, dignified vehicle for convenience and economy in getting about; for city and country salesmen, for physicians; for military and police service, and for commercial purposes. Constructed and designed by automobile engineers.

Starts instantly from a standstill, without pedaling or touching feet to ground. No mud or grease from a chain drive. Wonderfully silent, vibrationless motor.

MILITAIRE AUTOCYCLE

Automobile Construction—Motorcycle Upkeep

Combines all the advantages of automobile construction with the unequalled economy of motorcycle upkeep. 40 to 60 miles per gallon of gasoline. Tire upkeep but one-fourth that of lightest automobile. Garage rental negligible. Offers the latest approved principles of motor car construction:

Channel steel frame, as opposed to impractical diamond or V-shaped motorcycle frames which result in mechanical complication, heavy construction and improper balance.

Pivoted Front Axle, making possible for the first time the adoption of an underslung frame and the use of automobile construction throughout. Eliminates impractical carriage of transmission on rear axle and provides for shaft drive. Permits equal distribution of weight and insures very low center of gravity and perfect balance. Enables operator to turn sharp corners without leaning or shifting of weight.

Specifications: None but units which have become standardized in motor car construction. No experimental features—but everything of highest quality.

Write today for free illustrated booklet and full information.

Automobile Dealers Wanted

Militaire Autocycle Co.

Buffalo

(of America)

New York



Don't Pay Good Money for a Private Brand !

Buy the Same Upholstery Covers from the Manufacturer and Save One Big Profit

MR. DEALER, think of the best Auto Upholstery Covers of which you have any knowledge. No matter what name these goods may bear or what trade-mark they may be sold under, the chances are that they are made by Warner. For twenty-two years we were manufacturers of Buggy Accessories. For the past eight years we have been large manufacturers of Auto Accessories and have made fully 95% of all Auto Upholstery Covers shipped out of Cincinnati. The output of our factory has been marketed by exclusive distributors who sold the goods under their private brands.

This was unfair to the dealers who had to pay two profits instead of one in order to secure our product with its many features of exclusive superiority. It was unfair to the consumers who were forced to pay exorbitant prices. It was unfair to the distributors because they were building their reputation on a line of goods over which they had no permanent control. It was unfair to ourselves because it limited our business expansion to the selling capacity of the favored distributors.

So we have refused to renew these exclusive distributors' contracts and have deliberately cut out the private brand business altogether. Hereafter we sell Warner Covers under their proper name and trade-mark.

WARNER AUTO UPHOLSTERY COVERS

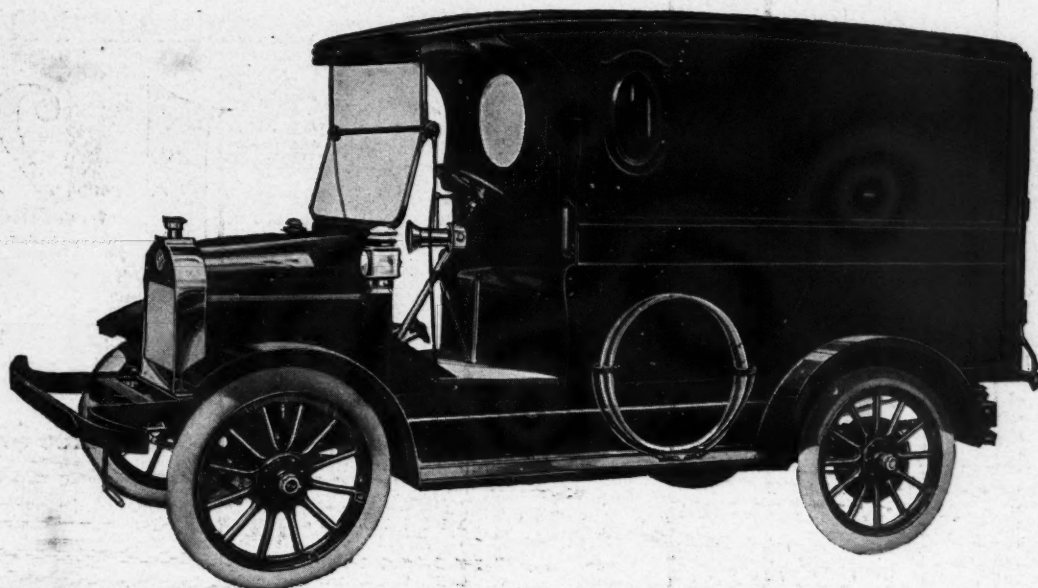
FIT LIKE A GLOVE
DUST-PROOF WEAR-PROOF

Our retail list is only a trifle more than half as high as the retail lists of exclusive distributors who have been selling our goods under their own private brands. Our discounts to jobbers and retailers are fair and reasonable; they allow for a good margin of profit and a quick turnover. Our goods will be maintained at the same high standard of quality, style, material, workmanship and fit that has built the reputation of distributors who have been selling our goods as their own product. Our stock will be kept up to date and ample for all demands. We will make rush deliveries the same day orders are received.

Here, Mr. Dealer, is your opportunity to cut out the tax that the favored distributor demands for the privilege of using this trade-mark on our goods. We do not ask you to load your shelves with a big stock of Warner Covers. But you owe it to yourself to write at once for our catalog, price-lists, trade discounts and samples of the various grades of materials of which our covers are made. Get our dealer helps and put yourself in position to command the cream of the upholstery cover business of your community by offering the best values at the lowest prices.

We have patterns for about all the leading American cars

The Warner Auto Top Company 1638-1642 Central Ave. **Cincinnati, Ohio**



SEVEN types of body but only one chassis, and on this famous chassis is built the VIM reputation. It is the result of the concentrated endeavor of motor truck engineering brains, backed up by our big manufacturing facilities. The wonderful performance of this VIM chassis in every line of business over the entire country has made us the

Largest Exclusive Producers of Motor Trucks

\$620
TO
\$725

**Seven
Body
Types**



20 Mile Radius

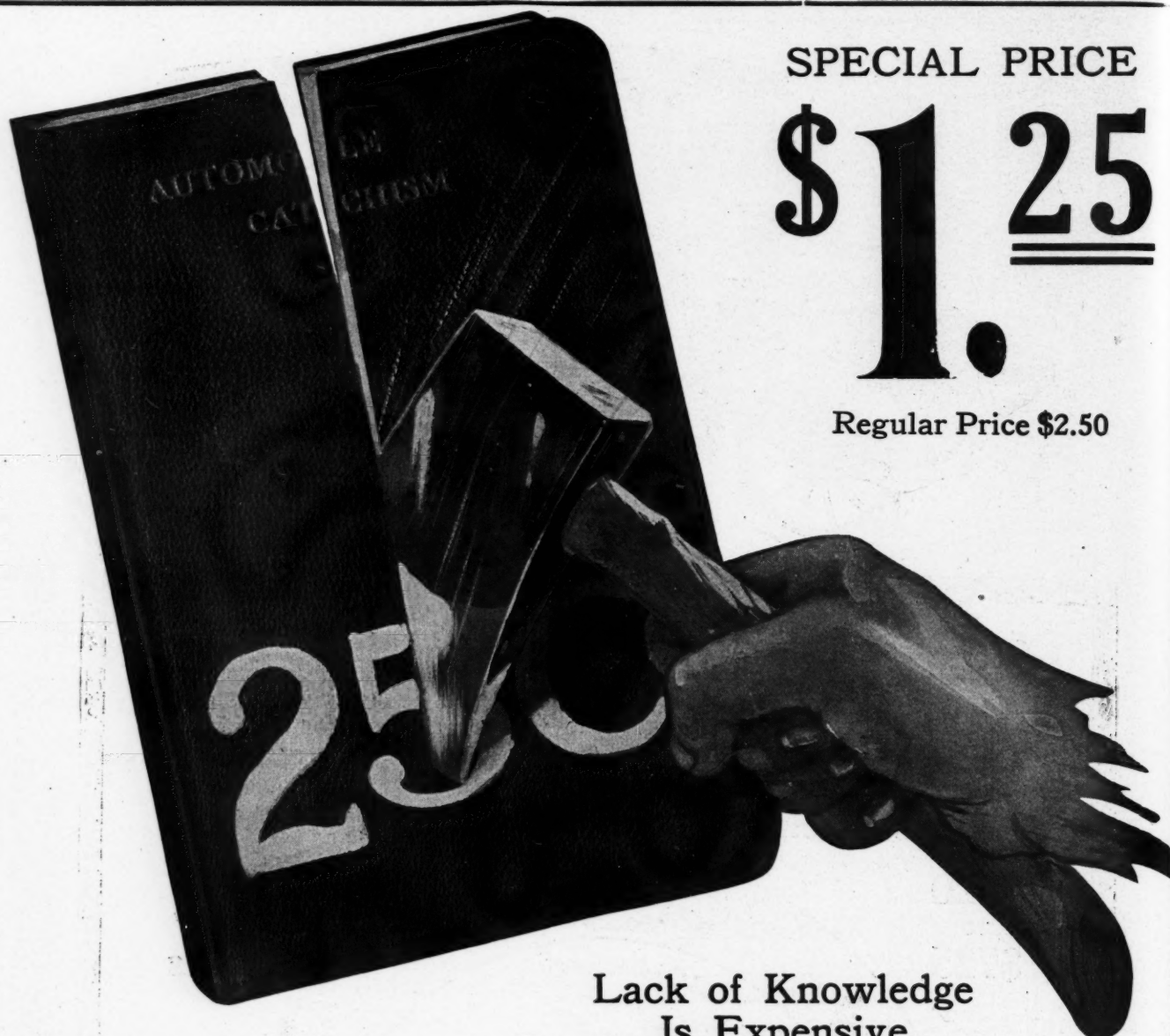


5 Mile Radius

HALF TON CAPACITY
VIM
DELIVERY CARS

Made in
Philadelphia by
**The
Touraine Co.**

Sold in 279
Cities in the
United States



SPECIAL PRICE

\$1.25

Regular Price \$2.50

**Lack of Knowledge
Is Expensive**

"THE AUTOMOBILE CATECHISM" (de luxe edition) is a complete course in automobile instruction—each subject discussed and illustrated so that **YOU** will grasp every point worth while—every subject is made as simple as **A B C**. You are interested—you are instructed—you are directly benefited. Its information is final.

It's a handsome piece of book work—splendidly printed, with 101 illustrations; flexible black leather binding, rounded corners and gold-edged pages—beautiful, while being intensely practical.

It will be to your immediate financial advantage to acquire an intimate and practical knowledge of cars and their parts.

We want every reader of *Motor Age* to have a de luxe copy of "The Automobile Catechism." To make our offer irresistible we have decided, **FOR A LIMITED TIME ONLY**, to **CUT THE PRICE IN TWO**. This half price (\$1.25) will prove the best investment you ever made. Remember, this is the de luxe edition—264 pages—every page full of real, money-interest value.

Put your name and address on the corner coupon, tear from the page, enclose \$1.25 and mail today to—

THE CLASS JOURNAL COMPANY,
910 S. Michigan Ave., Chicago, Ill.

Gentlemen: Enclosed please find \$1.25, for which send me a copy of "The Automobile Catechism" (de luxe edition).

Name.....

Address.....

THE CLASS JOURNAL COMPANY

910 S. Michigan Ave., Chicago, Ill.



Made In
U.S.A.
and
Made Good

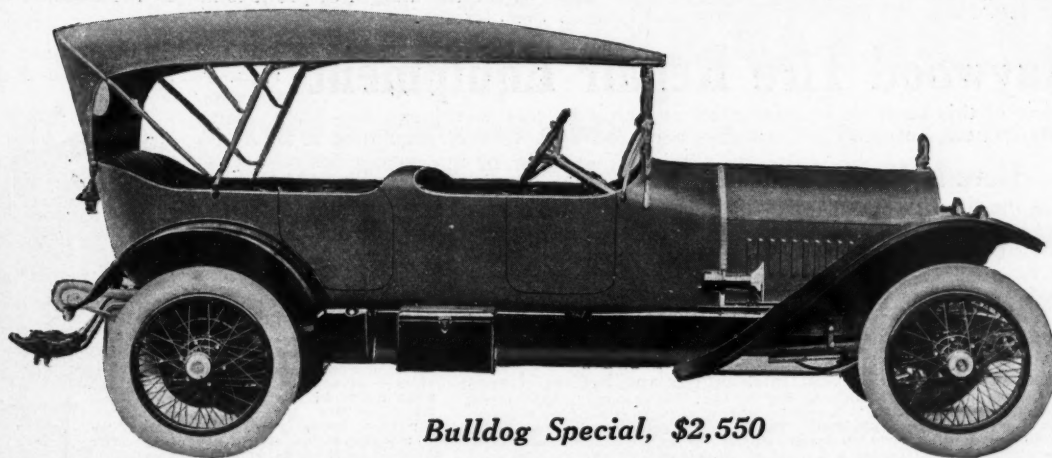


STUTZ

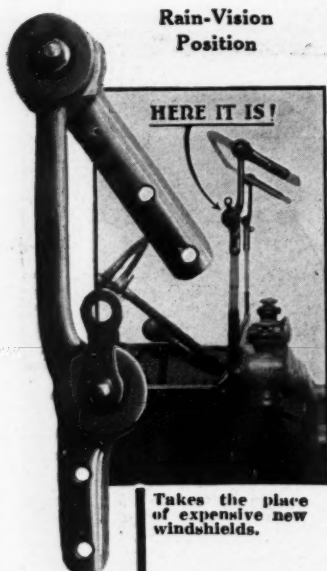
Stamina

American Design and Construction Vindicated at Minneapolis, Minnesota, September 4, 1915, when two STUTZ cars were entered and finished first and second, less than a car length apart (one-fifth of a second) averaging 86.35 miles per hour. Beating every Foreign Car entered and establishing American Superiority.

Stutz Motor Car Co.
Indianapolis, Ind.



Bulldog Special, \$2,550



Rain-Vision Position

HERE IT IS!

Takes the place of expensive new windshields.

**For
Ford
Cars
Now \$3**

Fits in
the old
screw
holes

Makes Windshields Clear-Vision, Ventilating Illinois Automatic Windshield Hinge

**For All
1914 and 1915 Ford Cars**

No need to pay \$10 or \$15 for a new windshield, when \$3 will transform the old one into a perfect ventilating, rain-vision shield. An Illinois Automatic Windshield Hinge turns the trick. Formerly \$5, now only..... **\$3**

**For All Other
Trucks, Limousines, Coupes**

Illinois Automatic Windshield Hinge swings to, and holds, 8 different positions at will of operator. Automatic, positive, fool-proof. Fastens on side of shield. Prevents spreading of frame. Easy to operate. Inexpensive. No. 3, **\$2.50** price.....

Absolutely Guaranteed

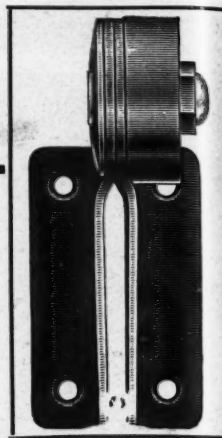
The only windshield hinge made of tempered steel and guaranteed for life of car. Fits any 1915 Ford with cowl dash. Special hinge for 1914 and 1915 models without cowl. Easy to attach. Simple adjustment for perfect ventilation and rain-vision. Richly finished in black enamel. \$3. Write for free illustrated circular. Swings up against top of car, entirely out of way of driver, if desired. Always clear-vision. Prevents accident in storms. Write for free illustrated folders.

Body Manufacturers—All satisfied users of Illinois Hinge. Only 20 minutes to install. Prices right. Investigate today.

Dealers—Winter and Fall are the best seasons for storm-vision shields. Big sales now. Liberal discounts. Write.

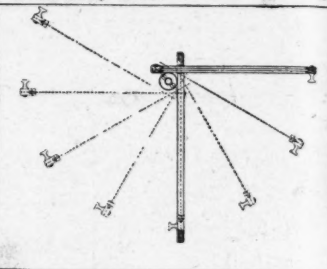
ILLINOIS BRASS MANUFACTURING CO.

11-17 S. Desplaines Street, Chicago



Illinois Automatic Windshield Hinge. Ready to attach on any truck, limousine or coupe.

Diagram shows eight positions Illinois Hinge will take and automatically hold.



MAKE \$250⁰⁰ A MONTH REPAIRING AUTOMOBILE TIRES

Sounds like a lot of money—IT IS—A WHOLE LOT of MONEY to be earning CLEAR every month—yet it's what hundreds of men we have established in the Automobile Tire Repair Business are making. You let down the DRAW BRIDGE for SUCCESS to enter into your career by getting into business for yourself. The business for you is the one where investment is small—the returns quick and for cash—where the margin of profit is large—the demand for your PRODUCT or SERVICE constant and ever on the increase.

A Haywood Tire Repair Equipment

answers to all of these requirements of Old Dame Fortune—the certainty of success in this business is as sure as anything in this world can be—Each year adds thousands of new Automobile Owners—they need YOU to keep their tires in service.

Here Is Your Opportunity!

Be first to enter this new, big paying business in your town. Open your pockets. Let the dollars pour in. Act quick. Every auto sold means more tires to mend. Automobile business is growing fast—enormous field for tire repairing. Punctures and blowouts are common. Tires need retreading and vulcanizing. Something going wrong all the time. Thousands forced to buy new tires because they can't get old ones fixed. Think of the old bicycle days—repair shops on every corner—all making money—busy day and night. Autos make same proposition over again—only ten times bigger and better. Users of Haywood Tire Repair Plants are making big money. Johnston, Tex., writes: "I have made as high as \$18 in a day." Another man who bought a plant September, 1911, writes he has cleared over \$3000.00. That's going some! Operate a plant as a side line in connection with auto business—garage or as an independent business. Find neighborhood where there's a bunch of autos—get all the steady business besides transient work. Experience unnecessary. You learn quick. Simply follow directions—practice a few days on a couple of old tires and you'll be ready to coin money. Business comes fast and easy.

Repair Tires At Home

Young men! and boys repair father's tires—get money he pays garage man. Get the neighbor's work. Make money to attend college or to start a garage and repair business. Auto owners—repair your own tires—save money—pay for your outfit in short time. We have outfits for home use. Anyhow, investigate. Send today for catalogue. See the wonderful possibilities in this marvelous field. Learn of the enormous money-making opportunities in this fascinating new business.

This Man is Making Money



Put yourself where this man is

HAYWOOD TIRE & EQUIPMENT COMPANY 720 N. Capitol Ave. The New Money-Making Business—Start Now
INDIANAPOLIS, IND.

Modern Economy



A hot spark causes a more powerful explosion than a weak one—and the hotter the spark the greater the power—

It takes more current to make a hot spark than a weak one.

However slight an increase in power one hot spark may cause, that increase, multiplied by the number of explosions that occur in a motor, bulks up into efficiency beyond the ability of other forms of ignition to accomplish.

AUTOMATIC · IGNITION CONNECTICUT

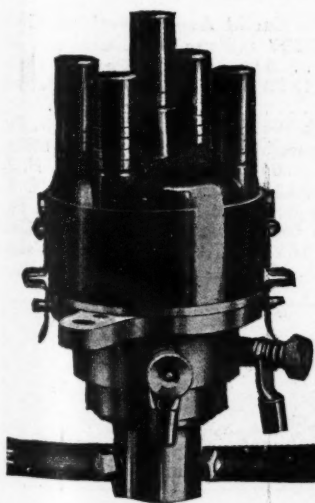
keeps its circuit closed as long as possible so as to put into each spark all the current necessary to produce a really effective spark.

What little power the generator requires for maintaining the current supply is returned hundreds of times over in the cumulative effect of more powerful explosions resulting from more effective sparks.

Can you conceive of a more preposterous idea of economy than that which sacrifices much of the motor's natural efficiency in order to save ignition current?

CONNECTICUT TELEPHONE & ELECTRIC CO., Inc., Meriden, Conn.

Ford Dealers—Write for information regarding Connecticut Automatic Ignition for Ford Cars—A. J. Picard & Co., Sole Agents, 1720 Broadway, N. Y.





The Staude attaches to any make of automobile. The pure amber glass protects the eyes of the driver from all bright and glaring lights.

THE STAUDE GLARE STOPPER

The Staude Glare Stopper is one of the fastest selling motor accessories of the year. It solves the head-light problem from the right end.

Every driver needs all the light he can get on the road.

RETAIL PRICE

\$2.50

The Staude protects the driver's eyes from blinding headlights, yet in no way impairs the view of the road. It dissects the light rays and eliminates the glare.

The beautiful, rich, amber colored glass, 6 $\frac{7}{8}$ inches in diameter, looks fine and lends tone to any car.

The Staude is not "tinny" looking, and you know amber colored glass will not fade or curl like celluloid.

Most up-to-date dealers carry the Staude Glare Stopper, or we will send you one parcel post C. O. D.

The Staude is sold with a lasting absolute guarantee. If you are not delighted with the Staude and convinced after using it that it is indispensable to you, return it and your money will be refunded.

DEALERS

Write for our jobbers' and dealers' proposition. The Staude means quick turnovers.

Write us.

E. G. Staude Manufacturing Co.
2675 University Avenue St. Paul, Minn.

Dear Sirs:

Please send me by Parcel Post, C. O. D. \$2.50 prepaid, one complete

STAUDE GLARE STOPPER

with the understanding that I may return it, if unsatisfactory, and get my money back.

Make of car.....

Name.....

Address.....

City..... State.....

"FALLS" TIRES



Fall Tires cost less per mile.
Write for the proof.

Guaranteed 5000 Miles

The Falls Rubber Company, Cuyahoga Falls, O.

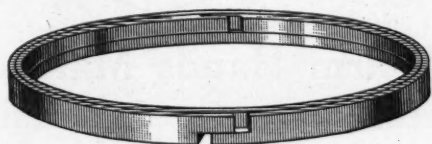
BRANCHES AND DISTRIBUTORS

The Falls Rubber Co. 2001 Euclid Ave., Cleveland, Ohio
The Falls Tire Co. 2307 Indiana Ave., Chicago, Ill.
The Denver Rubber Co. 516 16th St., Denver, Colo.
The Myers-Hoffman Tire Co. 1520 Jefferson Ave., E. Detroit
The Servus Vulcanizing Co.
..... Tunnel St. & Webster Ave., Pittsburgh, Pa.
Naegle & Lamb Co. 1204 Hennepin Ave., Minneapolis, Minn.
Falls Tire Co. of New Jersey 64 Halsey St., Newark, N. J.
Royal Tire Co. of New York 833 7th Ave., New York, N. Y.
The Falls Tire Co. 633 N. Broad St., Philadelphia, Pa.
Costello-Lang Co. 556 Golden Gate Ave., San Francisco, Cal.
Seattle Tire & Rubber Co. 1624 Broadway, Seattle, Wash.
McAdams & McCrery Urbana, Ohio

NEVER SLIP

When Writing to Advertisers, Please Mention Motor Age

VAPORTIGHT



BUY THE RINGS WHICH HAVE STOOD THE TEST OF TIME

The Baker Valve Company has been using Vapor Tight Rings on all kinds of motors for over 8 years.

The Vapor Tight is a double ring with the splits perfectly sealed, absolutely preventing leakage and reducing carbonization to a minimum.

Two Vapor Tight Rings to a cylinder are sufficient. Other manufacturers recommend three or more. Every motorist admits that leak-preventing rings greatly increase the power of a car. You should not be without them.

But in buying why not get those which have stood the test of time?

The Vapor Tight is without pins—a double ring all made of the same metal. It gives perfect combustion and additional power. The Vapor Tight is of exceptional flexibility, made from metal of our own selection. There are no weak spots in the Vapor Tight Ring because there are no pins in it.

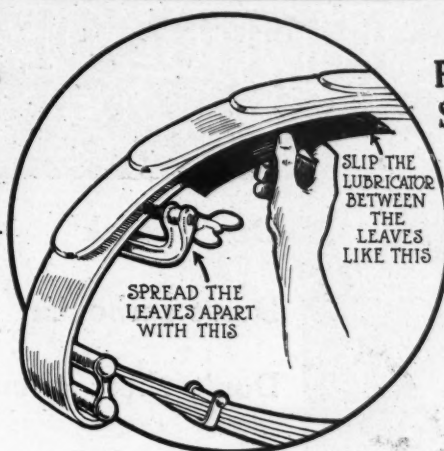
Any dealer can get Vapor Tight Rings for you.

Insist on Vapor Tight.

Dealers and jobbers find our introductory proposition especially interesting. Write today.

Baker Valve Co.
BLOOMINGTON STATION
Minneapolis, Minn., U. S. A.

\$1
Insures
an
Easy
Riding
Car



\$1
Prevents
Squeaky
Rusty
Springs

Lubricate your springs permanently—without taking them apart!

Insurance for one or two years against spring squeaks, stiff and rusty springs, spring breakage and a host of other troubles! And all for \$1! Just think of it!

The Avery is the only spring lubricator of its kind that can be installed without laying up your car—taking down springs—or entailing heavy installation cost. At \$1 it is the lowest priced lubricator obtainable.

AVERY RIDEOVER SPRING LUBRICATORS

—are thin flexible strips of specially graphited material. Nothing to spread the leaves apart or cause unnecessary friction. The entire surface of these strips is lubricated. Strips adhere to the spring leaves and cannot possibly work out. Can be quickly installed by anyone.



\$1 invested now in the care of your springs will save you many \$\$\$ in repair bills later on. Keep the water, mud, grit and dust out of your springs!

Boxed in sets of 60

Nothing causes a car to depreciate so quickly as squeaky, rusty, hard-riding springs. Protect the car's mechanism. Don't delay. Every minute your springs are unprotected your car suffers. Now is the time to prepare for hard driving over rough winter roads.



This spring leaf spreader sent postpaid for 50c.

Send \$1 for package containing 60 lubricators, sufficient for equipping all four springs of any car. Sent prepaid. Add 50c if you desire a guaranteed spring leaf spreader to facilitate installation. Ask your dealer. If he is not supplied order direct. Use the coupon.

Money Back If Not Satisfied

Free sample of lubricator sent on postal request

Avery P. L. Company

351 National Avenue, Milwaukee, Wis.

Enclosed find \$1 for which please send me postpaid one box of Avery Rideover Spring Lubricators—money refunded if same are not satisfactory. (Add 50c if spring leaf spreader is desired.)

Name
Address

SPLITDORF

COMMON SENSE SPARK PLUGS

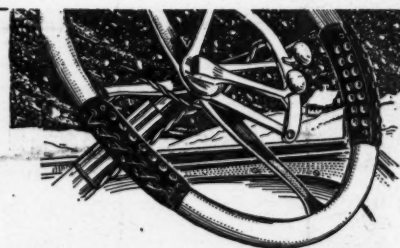


Don't break
Don't carbonize
Don't short circuit
Don't give any trouble

—which is more than can be said of any other plug manufactured.

SPLITDORF ELECTRICAL CO.
NEWARK, N. J.

Laces
on in
Ten
Minutes



Consumes
Little
Current

Warm Hands Make Winter Driving a Pleasure

You can now be comfortable in the coldest weather. No matter how low the thermometer goes your hands will be warm if you attach to your steering wheel a pair of

Steer Warms

They consist of two leather covered grips that lace on to the wheel at any place convenient for driving and are heated by electric current from battery or magneto (on Ford cars). Steer Warms maintain an even high temperature and consume little current. If you want to run your car in the winter, Steer Warms make driving comfortable. They make driving safer, too. Warm, limber fingers grip the wheel better—you can steer safely on icy streets. Besides they ward off colds—warm hands warm the body—and a warm body doesn't catch cold. They save you, too, buying several pair of heavy winter gloves—light gauntlets will do. Steer Warms are easy to attach. No holes to bore—no screws. Lace on—wire up—that's all. Never get out of order. Look well on car. Sold under a 5 year guarantee. If your dealer hasn't them, will send prepaid upon receipt of price. Money refunded if not as claimed. Descriptive circular upon request.

Prices

For Ford Cars.....\$5.00 In Canada.....\$6.50
For Other Cars..... 7.50 In Canada..... 9.00

When ordering give make of car and voltage of batteries—if Ford, whether 1914 or '15 Model.

Dealers: Write at once for information about a fast selling winter accessory.

Interstate Electric Co.

848 Perdido St.,
New Orleans, La.

For Leaky Cylinders

Superior to All Others



PATENTED AUGUST 6, 1912

A Piston Ring Which Gives Compression in "Out-of-Round" Cylinders as Perfectly as in True Ones



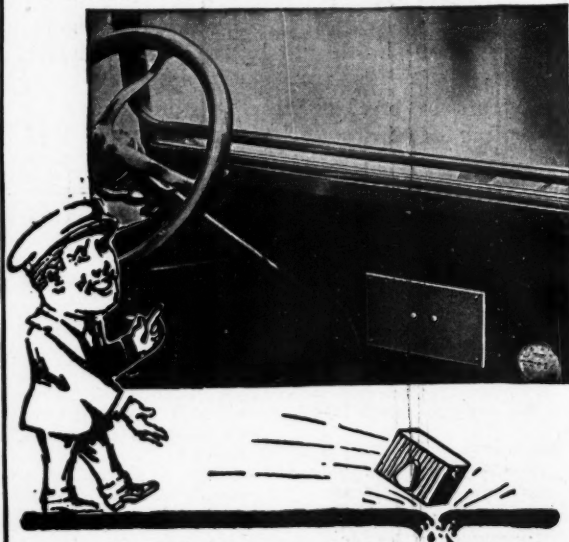
Here is a piston ring that gives 100% efficiency to every type of motor, engine, compressor or pump. Ideally adapted to use in Automobile and Motorboat engines. Gives compression when all others fail. No need to rebore worn cylinders—simply install EVER-TIGHT piston rings and the motor is good as new.

EVER-TIGHT piston rings are made up of three individual, interlocking rings, grooved together to give flexibility and reduce friction. This three-part construction is clearly seen in illustrations above. This is the only perfect three-piece piston ring on the market.

If dealers do not carry EVER-TIGHT piston rings, Auto repair men should write us. Jobbers and dealers wanted everywhere. Write for particulars.

THE EVER-TIGHT PISTON RING CO.
1432 CHESTNUT STREET ST. LOUIS, MO.

MODERNIZE YOUR FORD



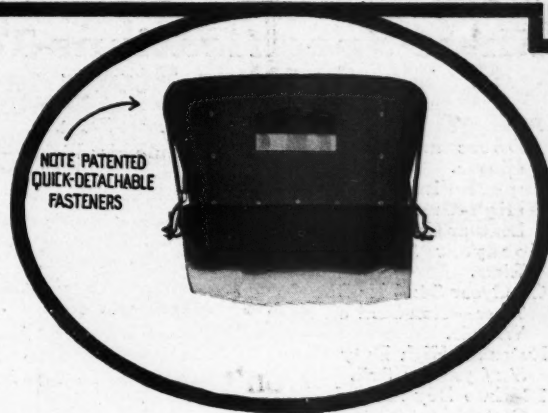
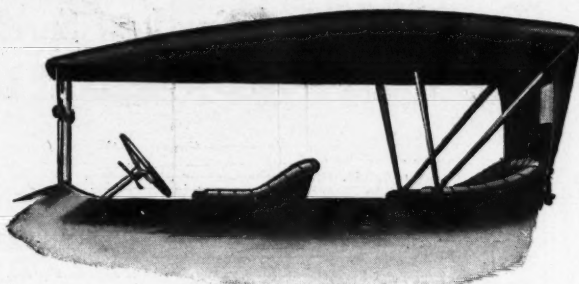
Away with the unsightly coil box. In its place—the flush dash switch of Connecticut Automatic Ignition—not only because of the improvement in appearance but because this system of ignition is the most modern, effective and economical improvement you could make.

AUTOMATIC IGNITION CONNEGTIGUT

A. J. PICARD & CO., 1720-22 Broadway, New York

Sole Distributors

Correspondence solicited with Ford Owners and Dealers.



Dignify Your Ford with an

American One-Man Top

Made of genuine, high quality silk mohair, fitting as perfectly as a hand-made glove, without a sag or a wrinkle, this top lends a distinctive style to your Ford Car.

And its usefulness makes driving an added pleasure and comfort. Note the free clearance due to the absence of side bows, which permits no obstruction to the view or entrance of the driver.

Your little boy or girl can raise this top unaided, and with the heavy storm curtains that roll up snugly out of sight, you can get in a minute rain-tight, weather-proof protection. The popular demand for this handsome, useful accessory makes it a profitable proposition for the dealer. An American One-Man Top on your demonstrator will call striking attention to its style value and make you many sales at first sight.

Price \$27.50 Complete with quick attachable side curtains, mohair slip-covers and wind shield fasteners

Write at once for our attractive dealers' and jobbers' proposition.

DALY & COMPANY, 319 Hammond Bldg., Detroit, Mich.

Made by the American Top Co., the largest manufacturers of automobile tops in the United States. Factories: Detroit, Jackson, Mich., and Tilbury, Ont.

TRADE MARK
NON-FLUID OIL
UNITED STATES PATENT OFFICE

Saves Power and Is Better than LIQUID-Oils, and Greases, for Gears and Bearings



If your lubricant leaks out—if your gears rattle for lack of proper lubrication—if you are losing power through undue friction, **NON-FLUID OIL** will obviate your troubles. Unlike grease, **NON-FLUID OIL** requires no frictional heat, and consequent loss of power, to melt it before beginning lubrication. It is instantly drawn into the bearings with the first revolution and instantly begins its lubricating function. **NON-FLUID OIL** keeps bearings cool—it never fails to provide a durable, pressure-resisting cushion between moving parts—metal never touches metal—there is no abrasion—the only wear is a slow, oily polish which transmits the power with least friction and with least loss.

"K No. 000" for differential, compression cups and all bearings

"K No. 00 Special" grade for sliding gear transmission

Get a Can Today and Prove It

Reduced Prices for 1915—Ask Your Dealer

The original **NON-FLUID OIL** is identified by orange-colored cans bearing the above sprocket-wheel trade mark. Avoid substitutes.

New York & New Jersey Lubricant Co.

165 Broadway, New York

1430 Michigan Ave., Chicago

When Writing to Advertisers, Please Mention Motor Age

These Specifications Tell Their Own Story

Roomy Tonneau. Flush Type Doors and Concealed Hinges.
 Superb Finish. Genuine High-Grade Enameled Leather Upholstery.
 Goodyear Demountable Rims.
 Goodyear 34x4 No-Rim-Cut Tires—Non-Skid on Rear Wheels.
 Rutenber High Duty Motor, Six Cylinder, 3x5.
 12-Plate Dry Multiple Disc Clutch.
 Spicer Dust-Proof Self-Oiling Universal Joints. Tubular Propeller Shaft.
 Spiral Bevel Driving Gears. Pressed Steel Rear Axle Housing.
 Brown-Lipe Differential. Hotchkiss Drive.
 Crowned Fenders. Rim Type Tire Carrier.

Unit Power Plant.
 Two-Bulb Headlights—Conforming With City Ordinances for Dimming
 Linoleum-Covered Runboards. Storage Battery Under Footboard.
 Brown-Lipe Transmission—Aluminum Case.
 Stewart-Warner Vacuum Gasoline Feed System.
 Westinghouse Ignition System.
 Westinghouse Starter—Bendix Drive.
 18-Inch Corrugated Walnut Steering Wheel.
 One-Man Top. Jiffy Curtains.
 Rain-Vision Windshield—Integral With Body.
 Wheel Base 119 Inches.
 Weight 2600 Pounds.
 Price \$1095 f. o. b. Peoria.

1916

Glide

Light Six
"40"

\$1095

The Bartholomew Co., 215 Glide St., Peoria, Ill.

Guaranteed for 10,000 Miles



BRICTON Pneumatic Tires are guaranteed for 10,000 miles and under a specific 10,000 mile written service guarantee. What more can you ask of a tire? With Bricton Tires, punctures, blowouts and rim-cuts are eliminated—they are proof against ruts, oil and gasoline. Resilient and easy riding, too.

Try Them at Our Risk

Give Bricton Tires a free trial on your own car. Put them to test at our expense. Find out why Bricton Tires sales are increasing daily.

Your Tires Rebuilt the Bricton Way

If the fabric in the tires now on your car is in good condition, we can take them and make them proof against rim cutting, punctures, blowouts, sidewall breaks, skidding, ruts and oil and give you thousands of miles of additional service.

Write today for full information about Bricton Tires. Tire Rebuilding and details of our liberal Free Trial Offer.

THE BRICTON MFG. CO.
1295 Bricton Bldg.

Brookings

South Dakota

Bricton Pneumatic Tires

\$1.50



KNOWLSON Spring Leaf Spreader Makes Spring Lubrication Easy

WARNING: We advise the trade that we intend to rigidly prosecute every person, not authorized by us, who makes, sells, or offers for sale, any spring leaf spreader or opener with wedges, as they infringe our patent rights. To avoid complications insist on KNOWLSON'S Spring Leaf Spreader.

Make Springs Last Longer

Don't let the leaves of your springs rust together, squeak, and break. Keep them alive all the time, with proper lubrication. Get 100% spring efficiency, and an easy-riding car, with KNOWLSON'S Spring Leaf Spreader and a little grease.

Fits any automobile spring. Simple, quick, effective. Won't damage or mar springs. Makes shock absorbers unnecessary.

Write for free illustrated circulars. Sent anywhere, prepaid, for..... **\$1.50**

Dealers Wanted

**Spring Leaf
Lubricator Co.**

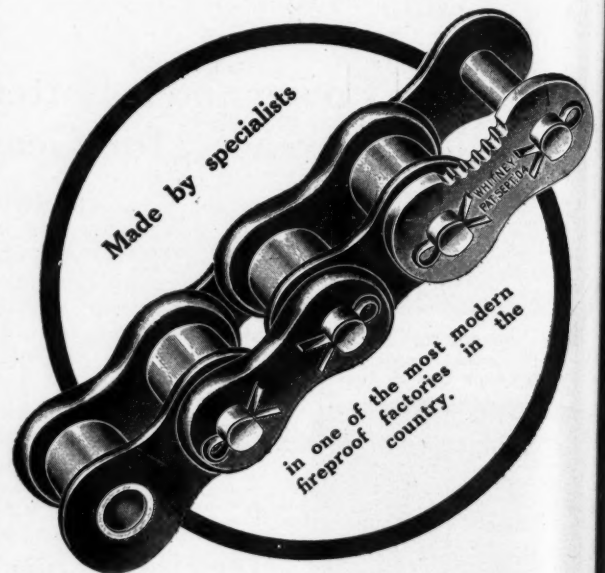
1004 Forest Ave.
Ann Arbor, Michigan



Note the Opening

"WHITNEY" CHAINS

The Most Practical for Motor Trucks



Made by specialists

in one of the most modern
fireproof factories in the
country.

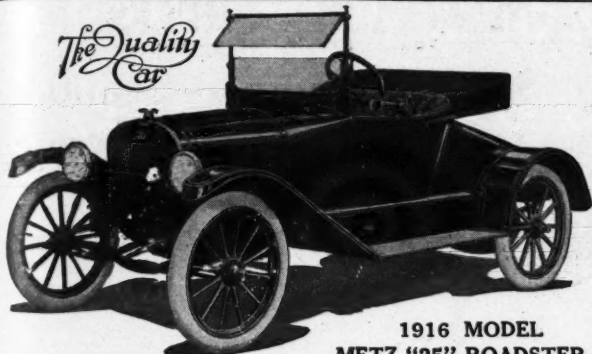
THE WHITNEY MFG. COMPANY
HARTFORD, CONN.

Chains

Keys

Hand Milling Machine

The Quality Car

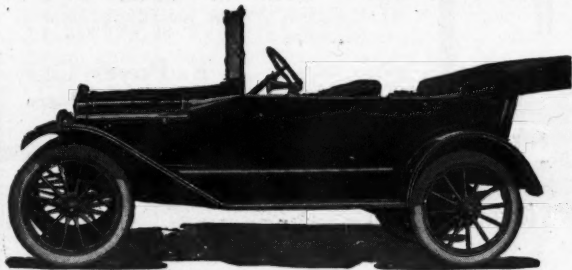


1916 MODEL
METZ "25" ROADSTER

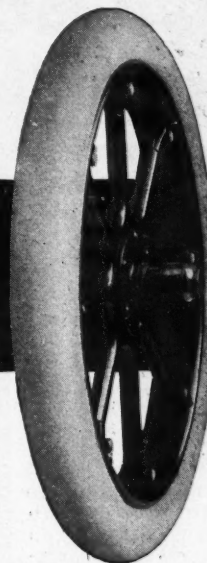
METZ

1916 models. Price, \$600 each, completely equipped. Both Roadster and Touring Car built on same chassis, 108-inch wheel base, and carry identical equipment, including electric starter and electric lights, 25 h. p. water-cooled motor, large wheels and tires, rain vision wind shield, instant one-man top, speedometer, built-in gasoline gauge, signal horn, etc. Write for DEALER particulars and new illustrated catalog "K."

METZ COMPANY, Waltham, Mass.



1916 MODEL, METZ "25" TOURING CAR



Dealers Know when they see the real thing
That is why they're wiring for full details of

PARKER-HYDRAULIC
Pressed Steel Wheels
for FORDS-\$19⁷⁵ SET OF FOUR

They know that these wheels will sell quickly because they give the motorist

1. Absolute safety due to great strength.
2. Ease and quickness of tire change, because they have the quickest and easiest demountable rims.
3. A saving in tires and gas due to light weight.
4. A lasting and durable, baked-on finish that's easily kept clean and non-rustable.

Let us tell you all about these wheels. Let us show you why they are the best proposition for live dealers. Write or wire for full information.



Builders of "Hydraulic" Pressed Steel Frames on which Reliable Cars are built

The Hydraulic Pressed Steel Company
3170 E. 61st St., Cleveland, O.

Schrader

FREE

**AIR IS FREE—
Rubber Costs Money—
RIDE ON AIR**

When the air in your tires falls below a certain pressure you no longer are riding on air, but on rubber. Measure your air with a

Schrader
**UNIVERSAL TIRE
PRESSURE GAUGE**

and save your tires.

Price, \$1.00

at your dealer's, or

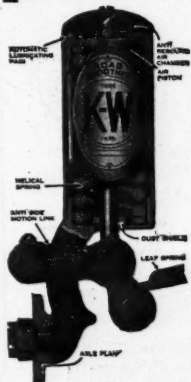
A. SCHRADER'S SON, Inc.
783-793 Atlantic Ave. Brooklyn, N. Y.



Taking up the shock checking rebound and preventing side-motion

are the three essential features necessary to give you greatest comfort over all kinds of roads.

You get these plus a construction that absolutely does not interfere with the steering only in



\$15 Set of Four

One for Each Wheel



Road Smoothers

Quickly applied to your Ford Car

They are sold by dealers who know the difference everywhere. If yours is out sent prepaid on receipt of price. Write for booklet, "That Satisfied Feeling."



2835 CHESTER AVE. CLEVELAND, OHIO, U.S.A.

Manufacturers of the 125,000 K-W Master Vibrators

Wisconsin

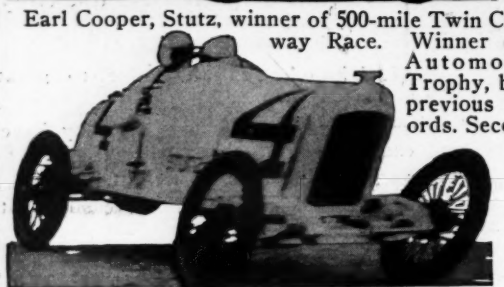
CONSISTENT

MOTORS

World's Champions on Road and Speedway



Gil Anderson, Stutz, winner of Elgin National Trophy, second in Chicago Automobile Club Trophy Race. Second in 500-mile Twin Cities Speedway Race.



Earl Cooper, Stutz, winner of 500-mile Twin Cities Speedway Race. Winner of Chicago Automobile Club Trophy, breaking all previous Elgin records. Second in Elgin National Trophy Race.

Ralph De Palma, Stutz, winner of Kalamazoo, Mich., 100-mile race.

WISCONSIN MOTOR MFG. COMPANY
Sta. A—Dept. 311 Milwaukee, Wis.

"The MENOMINEE" TRUCKS

FOR ECONOMY

\$1125—\$1400—\$1800

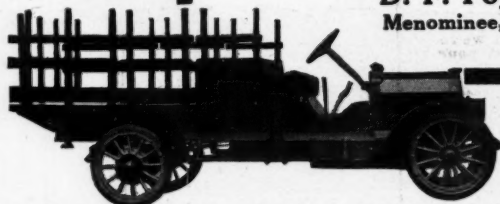


Every point necessary for complete motor truck efficiency, is included in all 3 MENOMINEE models—

But there is not one extravagant frill. Every demand that you will make of the MENOMINEE in commercial hauling, the Menominee will meet—And the cost will be commensurate with good business—conducive to liberal profits—cheaper than the horse.

One of the 3 MENOMINEE models—1500 lbs., 1-ton, 1½-ton—will fit your needs, at a saving. Investigate today. Dealers—If your prospect wants a motor truck he wants a MENOMINEE. Write for liberal dealers' proposition.

D. F. Poyer Co.
Menominee, Michigan



Model B-3, 1-ton Truck, Complete with Express or Stake Body, \$1500. Chassis only, \$1400.

Wayside Cooking Made Easy

This handy, efficient little acetylene stove is ideal for the motorist who likes to get out in the open and enjoy a real meal by the roadside. You can make hot coffee, broil a steak or fry a mess of fresh caught fish. No bother at all; gets away from the trouble of hunting up dry sticks and building a fire, or carrying a cumbersome oil stove. The Auto Hot Plate is ready for instant use, with any automobile size

PREST-O-LITE

\$4.50 brings an Auto Hot Plate to you by parcel post prepaid, packed in neat carton, 8x8x5. Weighs only 6 pounds.

Camp Lighting

The Prest-O-Lite stem-and-burner (price 55 cents postpaid) furnishes a very convenient and efficient camp light, when used with any size Prest-O-Lite cylinder. If desired, cooking and lighting may be had together by using a special two-way valve union, price 75 cents extra.

The Prest-O-Lite Co., Inc.

THE WORLD'S LARGEST MAKERS OF DISSOLVED ACETYLENE

233 Speedway Indianapolis, Ind.
Exchange Agencies Everywhere



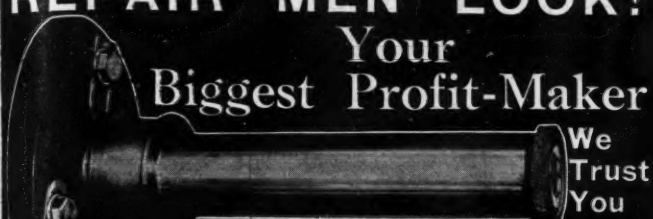
Send for descriptive circular on camp cooking and lighting

SIMMS ^{High Tension} MAGNETO and SIMMS-HUFF Electric Starting and Lighting System

Automobile Engineers unite in pronouncing Simms Products "Electrical Equipment Par Excellence."

The SIMMS MAGNETO Co.
East Orange, N.J.

REPAIR MEN LOOK! Your Biggest Profit-Maker



Acme Cylinder Grinder

An absolute necessity in every repair shop. Does the work of a \$2,000 machine slick and perfect. It's a corker! Sold direct from our factory under an iron-clad guarantee and easy payment plan.

GET OUR SELLING PLANS

Ship Back at Our Expense

If it fails to do all we claim for it, or is defective in workmanship or material, whereupon we refund every cent you paid.

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CYLINDER GRINDING is the most profitable, and when it becomes known that you are equipped for this class of work you're bound to get the business. We'll help you if you give us a chance and lend you a helping hand whenever possible. Those who've dealt with us will tell you we've got the right article at the right price, that we're fair and square; that our method of dealing is the best. Get your grinder right now. Get the big profits for yourself.

We Trust Everybody

anywhere, if honest. We haven't lost faith in mankind. Therefore we'll trust anybody who wants to do the right thing.

FREE BOOKLET Write for it. Contains full details. You want to make more money. Here's the way.

THE ACME GRINDER CO., Minneapolis, Minn.

SEE HOW LIGHT AUTOWLINE IS



BASLINE AUTOWLINE tips the scale at four and a half pounds. It's only 1/4-inch in diameter and about 25 feet long. In fact, there's "nothing to it" till you want a tow, and then Basline Autowline is the real thing. Put a good strong, purring motor at the "business end" of

BASLINE AUTOWLINE

and a sick car at the other, and there'll be some towing done right off. Basline Autowline is get-home insurance.

Being Yellow Strand Powersteel wire rope with patented Snaffle Hooks at each end for instant attaching, it never lies down on the job. It's a cinch you'll need one—sometime. What's the good in tempting chance? All dealers. Price, \$3.95 east of Rockies.

POWERSTEEL TRUCKLINE is the "big brother" of Basline Autowline. Extra strong for heavy towing. Price, east of the Rockies, \$6.50. If your dealer cannot supply you, order of us direct.

POWERSTEEL AUTOLOCK thiefproofs your car and spare tires. It's four feet of Yellow Strand Powersteel wire rope with thimbles spliced in each end and wrapped with waterproof fabric. A spring lock secures it around wheel and spring or spare tire and rack. Sold by dealers. Price \$2.00.

FREE Circulars. Write for them

BRODERICK & BASCOM ROPE CO.

813 N. 2nd STREET

ST. LOUIS, MO.

New York Office: 76 E. Warren Street

Makers of famous Yellow Strand Powersteel wire rope.

INLAND 1 PIECE PISTON RING



A Perfect One-Piece Piston Ring

that has all the virtues of eccentric, concentric and more-than-one-piece construction; and none of their disadvantages.

A continuous ring cut spirally for half its circumference, heat-treated so that the free ends hug tightly together; the result is an absolutely gas-tight ring that uncoils in expanding; insuring uniform pressure and perfect contact with the cylinder walls.

The strongest gas-tight ring on the market, because of its simple one-piece construction and, for the same reason, it costs less to buy; and less to install, for it is easier to put on and will not break in handling. Made of close grain cast iron.

Absolutely guaranteed; money refunded on any ring that fails to give perfect satisfaction after 90 days' trial.

Full description in free booklet

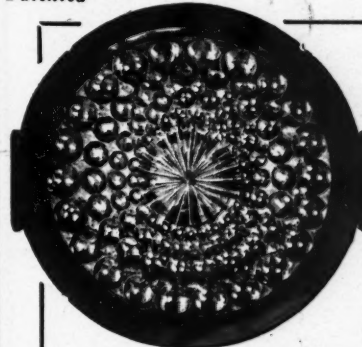
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Inland Machine Works

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St. Louis, Mo., U. S. A.

Patented



Try the Double-Lens Auto Headlight Glass

10 Days Free

Stops all glare and dazzle, but does not dim your lights. Throws driving light several hundred feet

ahead and distributes it where most needed. Plainly marks all ditches, ruts, etc., but never dazzles at any distance.

Used Wherever Dimmer Laws Are in Effect

Endorsed by leading engineers, police chiefs, and motor car manufacturers. In actual use by Chicago and other police departments. Not an opaque obstruction. Not painted on the glass. Just a clean, ground light-diffusing lens that throws "The Right Light—Everywhere." Satisfaction guaranteed, or your money back. \$1 to \$5 per set, according to size. Write for free illustrated folders and 10-day free trial plan. In ordering, state diameter of lens.

Dealers—Write for Co-operative Plan

Sold on Money Back Guarantee

DOUBLE-LENS GLASS CO.

1146 S. Michigan Avenue

Chicago

DOUBLE-LENS GLASS CO., 1146 S. Michigan Ave., Chicago.

Send me 10-day free trial plan and illustrated folders, describing DOUBLE-LENS Auto Headlight Glass.

Name

Address

My Accessory Dealer Is

MIDGLEY PATENTED TIRES

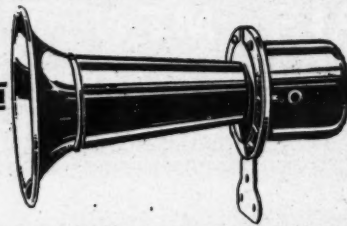
Wire Tread

Plain and Non-Skid
Inner Tubes

*Unexcelled—Write for
Complete Information*

The Midgley Tire & Rubber Co.
Dept. 11, Lancaster, Ohio.

701



Lowest Priced Electric Horn Obtainable

REXO II

\$3.85—Ready to Attach

Guaranteed for the Life of Your Car

THE GARFORD MFG. CO., 2508 Olive Street Elyria, Ohio, U. S. A.

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STORAGE BATTERY

*The Strong Right Arm of a
Starting-Lighting System*

GOULD STORAGE BATTERY CO.
General Offices, 30 E. 42nd St., New York

Write for our Agency Proposition

THE FAULTLESS
10%
CORASCO
MORE
POWER
CARBON DECOMPOSER

100% EFFICIENT

Sample Can \$1.00, Express Prepaid

CARBON REMOVER SALES CO.

Syracuse, New York
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DELCO

ELECTRIC LIGHTING CRANKING IGNITION

The man who sells a Delco
equipped car has a talking point
with a wonderful appeal to it.

THE DAYTON ENGINEERING
LABORATORIES COMPANY
Dayton, Ohio



ANNOUNCEMENT

The following prices f. o. b. Detroit, effective
August 2, 1915

Ford Runabout.....\$390.00

Ford Touring Car..... 440.00

Ford Town Car..... 640.00

No Speedometer included in this year's equipment,
otherwise cars fully equipped

Ford Motor Company

Detroit, Michigan

SALISBURY

AXLES WHEELS PROPELLERS

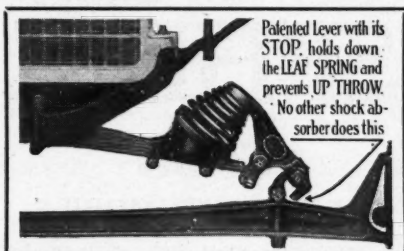
Salisbury Wheel
& Mfg. Co.
JAMESTOWN, N.Y.

HASSLER

Shock Absorber for Ford Cars—\$15 for set of four

has in the past three years established the Standard of Perfection for shock absorbers for Ford cars. When car owners ask of their dealers, "Is it as good as the Hassler?", it surely shows a prestige that could only be attained by giving absolute satisfaction to the user.

Dealers—Here is an opportunity to "cash in"—in a big way on your shock absorber sales—by selling the Hassler. It has created the market for you. Not sold through jobbers. We protect you. Write at once for our liberal selling plan and a trial set.



Patented Lever with its STOP, holds down the LEAF SPRING and prevents UP THROW. No other shock absorber does this

ROBERT H. HASSLER, Inc.
Indianapolis Indiana

Turn in Discarded Ford Tires As Part Payment For 4000 Miles of Ironclad Service

Don't throw away the worn-out tires from your Ford car. They're worth money to you, applied on purchase price of new IRONCLAD Double Tread Tires, that give 4000 miles of guaranteed wear at ½ the regular cost. Backed up by test, and our Ironclad—

Written Guarantee

\$5.50

\$6.50

\$7.50

For Ford
Cars Only

IRONCLAD Double Tread Tires are made from carefully selected stock, and are practically puncture-proof. Easy riding. Resilient. List: 30 x 3, plain, \$5.50; Non-skid, \$6.50. 30 x 3½, plain, \$6.50; Non-skid, \$7.50. Send \$1 deposit on each IRONCLAD ordered, and receive same C. O. D., subject to examination and approval. And your old tires partly pay the bill. Write for details and free circular.

Dealers
Wanted

Ironclad Tire Co.
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Chicago



DYKE'S Automobile and Gasoline Engine ENCYCLOPEDIA

By A. L. DYKE, E. E., originator of the first automobile supply business, publisher of the first practical automobile book, manufacturer of the first float feed carburetor in America.

A Teacher, Guide and Reference on everything pertaining to motoring. Simple as the A B C.

It's worth ten times its cost if only placed on the shelf and used as a reference when you are stuck.

Over 1000 illustrations, 596 pages, 268 full page charts, 41 instructions.

EVERY SUBJECT SIMPLIFIED.



Illustrations Are Simplified

There are over 1000 illustrations, just the kind you will understand and a new idea of building the parts up with progressive "ben dayed" drawings, something new. You certainly will make a very fine investment by sending for this book at once—the quicker the better for you.

Price \$3.00

This book is endorsed by the leading motor authorities of the world and used by forty automobile schools.

This book is just as the name implies; an Encyclopedia. No matter what you want to know relative to a gasoline engine, you will find it in this book.

Any trouble you can think of—can instantly be located by turning to the Index, then to the Digest of Troubles, which will give the cause and the remedy.

If you want to learn gasoline engines from A to Z—simply read the instruction Number Ten. Here you will find the first principles explained, then step by step you advance to the more complicated parts. After finishing this section you will understand all engines; auto, marine, motorcycle, aero and stationary engines.

You will understand the purpose of the valves, and the different valve principles. You will be able to time valves and do other repairs on engines.

Class Journal Co., 910 S. Michigan Ave., Chicago

One Million Dollar Stock

Machinery

Equipment

Materials

Dies

formerly of the

United States Metal Products Co.

6th to 10th Streets, College Point, L. I.
3rd to 4th Avenues (Opposite New York City).

Will Be Sold in Single Lots Only to the Highest Bidder at Public Auction at the Plant

Beginning

Monday, Oct. 4, 1915

at 10:30 a. m.

and continue until sold by

CHARLES SHONGOOD, Auctioneer

Office: 539 Broadway, New York City

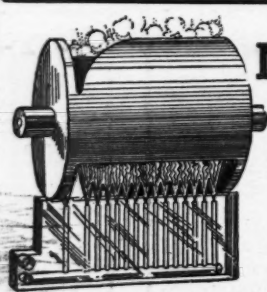
The largest metal manufacturing plant ever offered at public sale in separate lots, consisting of a general variety of Machine Tools, Power Presses, Metal and Woodworking Machinery of every kind; Motors, Generators, Air Compressors, raw and manufactured material in Bronze, Copper, Brass, Steel, Iron, Wood, etc.

1,000 Machine Tools, Lathes (all makes)

100 Westinghouse Motors

Tons of Raw Material, Lumber, Paints, Etc.

THE AUCTIONEER INVITES INTERESTED BUYERS FROM ALL PARTS of the country to attend this sale, and assures them that their expectations will be fully realized.



THE MASTER Carbureter

will give you the maximum efficiency from that engine—power, speed and fuel economy. Its simple construction eliminates adjustment, and makes your carbureter trouble a thing of the past.

Fuel Inlet Master Throttle and Fuel Distributor

A MASTER user is always a MASTER enthusiast
MASTER CARBURETER CORPORATION

1804 West Fort Street, Detroit, Mich.

Pacific Coast States: Master Carburetor Co., Los Angeles, Cal.

HEINZE

High Tension Magneto

HECO

HECO

FACTORIES
Lowell, Mass.

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NEW ENGLAND DISTRIBUTOR
A. P. Homer
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Better Material
Better Workmanship
Better Manufacturing facilities

Make Heinze the Better Magneto

HEINZE ELECTRIC COMPANY

Gasoline Can't Explode

You can build a fire under a McNutt can—you can hold a match in the opening of a McNutt can—it will **never** explode.

Hundreds of tests have been made by the New York and other Fire Departments, but no McNutt can has ever exploded.

Also—these cans prevent loss by evaporation and are so well made and reinforced that they will outlast 20 ordinary containers.

SEND FOR CATALOGUE—Our catalogue describes cans for every use and gives prices. Tear out the advertisement now to remind you to send for it.

DEALERS—These cans and devices sell on sight; remarkable opportunity; write for proposition.



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320 Broadway

New York

THE POWERFUL, SILENT SPHINX

\$695

A REAL AUTOMOBILE

The lightest, strongest, most serviceable and economical machine of its kind ever built.

112 inch wheel base. Electrically started and lighted.

Sphinx Motor Car Company, York, Pa.

The Niagara Motor Car \$740

36 H.P., 5 Pass., Wgt. 1970 lbs.

The Niagara Motor Car meets an exacting ideal. Full-sized and generous in all proportions. Beautiful to the eye. Stylish, dignified, snappy, attractive and superbly finished.

Exceptional opportunity for dealers. Unusual dealer assistance. Write or wire for "Dealer Helps" talk, and full information about our liberal selling plan.

MUTUAL MOTOR CAR COMPANY

Makers of Niagara Motor Cars

917-927 Main Street

Buffalo, N. Y.



Write for complete details of new series
MARMON "41"
Nordyke & Marmon Co.
Indianapolis, Ind.

CARSRING TIRES

BEST UNDER A CAR - BEST ON EARTH

Will establish you in business on a permanent and profitable basis.

Our Policy:

One good dealer in each territory, backed by the best goods and unlimited co-operation.

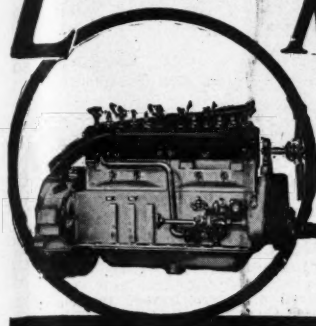
New Jersey Car Spring & Rubber Company
Jersey City, New Jersey



HOLLIER

\$985 EIGHT \$985
It leads the leaders
THE LEWIS SPRING & AXLE CO
JACKSON MICHIGAN

Continental Motors



Models—FOURS
 Model U, 2 3/4 x 4 Model C, 4 1/4 x 5 1/4
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 Model C, 3 3/4 x 5 1/4 Model T, 5 1/4 x 5 1/4
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 Model 7 W.....3 1/4 x 4 1/4
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CONTINENTAL
 MOTOR MFG. COMPANY
 DETROIT, MICH.
 Factory Representative, K. F. Peterson,
 122 S. Michigan Ave., Chicago.

The ALL-YEAR Car

THE new models of the ALL-YEAR Car are very beautiful—both Detachable Coupe Top at \$300 and Detachable Sedan Top at \$350.

New Touring Models

32-Four \$1050 36-Four \$1250 42-Six \$1485
 Also Roadsters, Limousines, Cabriolets
 Send for literature.

KISSEL MOTOR CAR COMPANY
 121 Kissel Ave. Hartford, Wis.

KISSEL KAR

EVERY INCH A CAR

1916

\$850



Same Car
 New Price

Touring &
 Roadster

Corcoran Lamps

GAS, OIL, AND ELECTRIC
 CORCORAN LAMP CO.
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ALWAYS ON THE JOB

Standard Trucks

Chain and Chainless

Meet Every Demand

DEALERS should carefully consider the rapidly growing demand for standardized heavy duty, double duty 4-cylinder trucks. The standardized "STANDARD" meets this demand in every way.

Send for booklet B 30, describing all capacities.

STANDARD MOTOR TRUCK CO., Detroit, Mich.

22-72
 Series



Four
 Cylinder
 Only

Ready for Delivery Early in November

DETAILS ON REQUEST
 MERCER AUTOMOBILE COMPANY
 800 Whitehead Road, Trenton, N. J.

Provided
 with or without
 padlock.



for
 FORDS

Oakes Kranklock

Oakes Kranklock combination starting crank holder and lock and license holder. Make your car thief-proof with this handy and serviceable combination. It holds the starting crank rigid and license tag securely. Every Ford owner needs one. Can be put on easily in a few minutes. No holes to drill. Prevents garage employees from using or tampering with your car while in garage.

50c Without Padlock

\$1.00 with Special Yale Padlock

Made by the makers of the famous Oakes

Fan-Horn-Pump\$12.50

Fan-Pump 7.50

Fan-Horn 5.00

Any Oakes accessory shipped direct on receipt of price.

Write for complete description of our entire line. THE OAKES COMPANY, INDIANAPOLIS, IND.

"Bridgeport" Pumps

BRASS
 TRADE MARK
 CO.

The Bridgeport Line includes pumps of varying styles and sizes adapted to the requirements of every type of car and tire. Jobbers and dealers write for discounts.

Bridgeport Brass Company
 Bridgeport, Conn.

Moline-Knight "40"

F. O. B. **\$1375** Factory

40 horsepower, 5 passenger touring and 2 passenger roadster, 118-inch wheel base, 34x4-inch tires (non-skid rears), spiral bevel gear rear axle, weighs 2,896 pounds ready for the road, Auto-Light starter, high tension ignition, complete equipment, 50 horsepower touring, roadster, sedan, limousine models—\$2,500 to \$3,800.

Moline Automobile Co., East Moline, Ill.

Highway Six
\$1690



National Motor Vehicle Co., Manufacturers, Indianapolis

Lexington

CRITERION OF ITS CLASS

Thoroughbred Six—\$1875

Minute Man Four—\$1375

Six Supreme—\$2575

Equipped with Moore Multiple Exhaust System

Write for details and co-operative dealer proposition

The Lexington-Howard Co.

18th Street West

Connersville, Ind., U. S. A.

How Far has your Car Run on HYATT QUIET BEARINGS?

\$1000.00 for Best
**HYATT SERVICE
RECORDS**

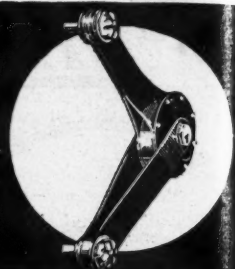


Write for entry form to
HYATT ROLLER BEARING COMPANY
Dept. 12 755 Woodward Ave. DETROIT, MICH.

Hartford

SHOCK ABSORBER

*For Comfort, Safety,
Economy.*



Stops jolting, jarring and vibration. Eliminates side-sway. Prevents spring breakage. Makes tires last longer. Cuts cost of maintenance. Insures longer life for your car. Contributes to solid auto comfort.

HARTFORD SUSPENSION CO.,

E. V. Hartford, Pres., 146 Morgan St., Jersey City, N. J. Manufacturers of Hartford Cushion Spring, Hartford Auto Jack, Hartford Bumper, Hartford Economizer, Hartford Electric Brake. Branches: New York, Boston, Philadelphia, Kansas City, Newark, Chicago, Pittsburgh, Indianapolis.

*Formerly Truitt Hartford.

Latest Tire Sensation!

BRAENDER

NEW BULL DOG
NON-SKID TIRE

This Tread is made under hydraulic pressure, not cut out, but pressed together into a homogeneous mass, resulting in a tougher tread.

Braender Non-Skids are as different from others as a dropped forging is from a casting.

Braender Rubber & Tire Co.

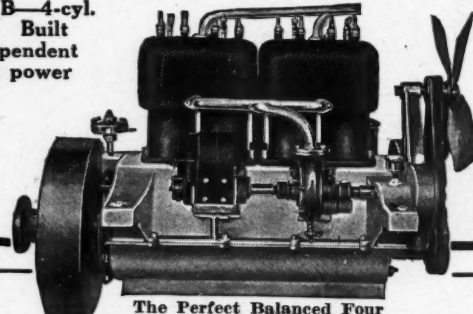
Main Office and Factory, Rutherford, N. J.

New York, 250 West 54th Street

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Model B—4-cyl.
4½ x 5. Built
as independent
or unit power
plant.



The Perfect Balanced Four

Been making good for 15 years on pleasure and commercial cars. Special model for Elmore and White Steam cars. Write

BRENNAN MOTOR MFG. CO.

Syracuse, N. Y.

4-Cyl.
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Raybestos
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THE PRODUCT OF BRAKE SPECIALISTS
USED FOR
BRAKE LINING - CLUTCH FACING
Manufactured by
THE ROYAL EQUIPMENT COMPANY
Bridgeport Conn.

WINTON SIX

To the family accustomed to touring cars, the closed car offers the only remaining new delight in motor car enjoyment. Also it contributes to their sense of well-being, and is, accordingly, the most gratifying contribution you can make to those you hold dear.

Prices are unusually attractive, ranging from \$3250 to \$3500. Write for catalog today.

THE WINTON COMPANY
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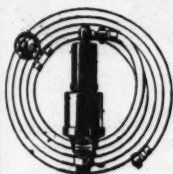
World's First Maker of Sixes Exclusively.

Hand Pumping Is Just Physical Torture!

But you will enjoy pumping tires with a

MAYO PUMP

Simply substitute the pump for any convenient spark plug. The motor does the work—lets the motorist out.



Price, complete with 12 ft. hose and gauge, \$10. MAYO Q. D. Spark Plug, \$1.50 extra. Try one Free on your car for 30 days.

MAYO MFG. CO.
55 E. 18th St., Chicago



The United States Motor Truck Co. CINCINNATI, OHIO OFFERS A FINE OPPORTUNITY TO DEALERS



FLEXIBLE and DURABLE

Economical and Powerful



Get Our Proposition

MADE IN 2, 2½, 3 AND 4 TON CAPACITY

The correctness of its construction combined with best quality materials and right prices, make the U. S. Truck a splendid value for buyers and a money-making proposition for dealers. Specifications and prices on request. Address Contract Dept. B.

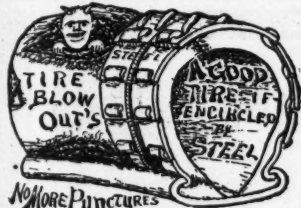
FREE!

Motorists, send and get your copy of our tire book—

"Care and Repair of Tires"

It is a guide and text book that will post you thoroughly. It tells the proper inflation according to weight, load and season. It describes fully how to protect the tires while car is idle in the garage—how to care for them in winter—how to avoid substances that rot the rubber and fabric. It gives splendid hints on the spare tire and its care—how to carry extra tubes. It explains the tire sleeve, the blow-out patch—repair plasters and plugs and emergency or temporary repairs. This book is quoted as an authority by American and Foreign Automobile Publications, because of the authentic information it contains. It's free to any motorist. No obligations. Just write and we will send it to you without cost.

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Steel Protectors

Each section 2" wide 1/8" thick. They hook to rim. As flexible as ever. Anti-skid, can't blow out or rim cut.

HOW CAN THE RUBBER WEAR OFF IF IT IS COVERED WITH STEEL?

Try 2 or 3 sections over any old blowout

Special prices to the first in new territory

Kimball Tire Case Co. 173 Council Bluffs, Ia.



Tire covered complete

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New York State
New Jersey
Pennsylvania
Southern States
Middle Western States
Transcontinental, Showing All Trails

These maps were prepared for us by the Automobile Blue Book Company.

Copies may be obtained from any dealer displaying the sign with the orange disc, or mailed on request.

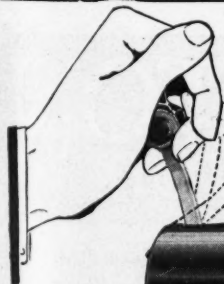
There is More Power in
THAT GOOD GULF GASOLINE and
SUPREME AUTO OIL

GULF REFINING COMPANY

Dept. 1875 Frick Annex

PITTSBURGH, PA.

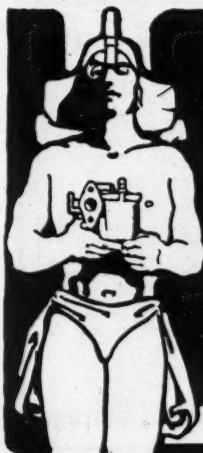
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SAFETY FIRST
SOUND
SPARTON

Sparton Safety Signals get instant attention on city streets or country roads. The clear, vibrant Sparton call is quickly adapted to every motoring situation. Use Sparton. Model "F" \$4 finished in satin, black and nickel, or all black.

THE SPARKS-WITHINGTON CO., Jackson, Mich.



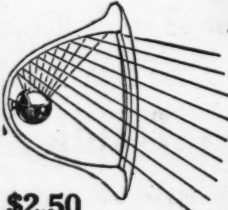
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KNOWN the world over as the zenith of simplicity and efficiency.

A precision instrument giving permanently, exact carburetion for your car.

Zenith Carburetor Co.
Detroit, Mich.

The Police



\$2.50
per pair


All the Power of your headlights with all the Glare left out.

— never stop the car whose lights are equipped with

Wheeler Deflectors

They fit over the headlight bulbs. Satisfy the law by keeping light from the lamps on the road, and out of other drivers' eyes. Full force of light obtained. Project light 100 feet or more ahead. At all good dealers, or sent prepaid direct on receipt of price.

He will never stop you



THE SPRINGFIELD AUTO DEFLECTOR CO., Inc.
516 Mitchell Bldg. Springfield, Ohio

Don't "Take a Chance"

on your Electrical Equipment breaking down. KNOW the exact state of the current supplying your Lights and Starting Motor, at any minute. There is no chance of them failing you unexpectedly if you have a



Weston

Model 354 AMMETER

On Your Dashboard or Cowl.
With a Weston Ammeter before you, you have a reliable means of determining the proper rate of charge or discharge of your battery for various speeds. It enables you to determine that the generator is working and that the storage battery is receiving its proper charge.

Write for full information

Weston Electrical Instrument Co.
10 Weston Ave., Newark, N. J.
Branches in the Larger Cities.

DOUBLE SEAL TIRE VALVE




No tool needed to seat or remove Valve

Interchangeable with All Stems

Fifty Cents Per Dozen
Single Valves, Five Cents

Double Seal Tire Valve Company
1790 Broadway New York City

The Bearings Company of America

Sales Department, 250 W. 54th St., New York





COMPLETE THRUST BEARING

RADIAL RETAINERS

MADE IN AMERICA

Manufacturers of Star Radial Ball Retainers, Star Ball Thrust Retainers, Star Complete Ball Thrust Bearings

SAFE IN THE GRIP OF



MULTIBESTOS

TRADE MARK REGISTERED

EISEMANN

The most simple—the most accessible—the most durable—the most efficient magneto ever produced is the new Type G-4.



The Eisemann Magneto Company
Sales and General Offices,
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New York, N. Y. Indianapolis, Ind. Detroit, Mich.
245 W. 53th St. 415-417 N. Capitol Ave. 892 Woodward Ave.

Limousine Tops for Ford Cars



Winter driving isn't very comfortable in an open car, and unless a man has a limousine, he usually stores his machine during the coldest months. Why lose from 3 to 5 months' pleasure when you can buy a limousine top so reasonable? This limousine is durably constructed; the framework is made of the best kiln-dried lumber, reinforced at the corners. It is fitted with an adjustable rain vision windshield and handsome cowl dash which add to the style and appearance of the car. Won't last long at the price, so send your order at once.

Special Price, \$110.00

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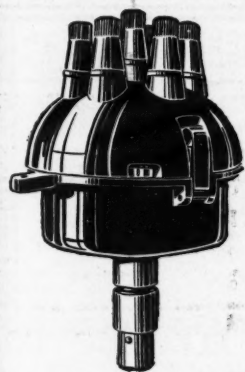
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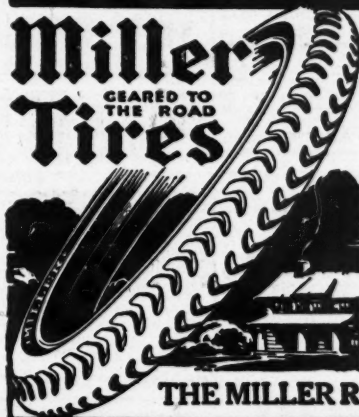
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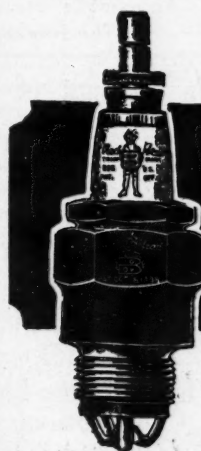
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Mighty Michigan 40 H.P., 4 1/2 x 5 1/4.....	\$150.00
Marion 30-35 H.P. with crank and pump.....	115.00
Piggins "T" Head, 4x4 1/2 with pump.....	130.00
Prugh 18-20 H.P. Unit Power Plant, center control, fitted with carburetor, Atwater-Kent Ignition and fan.....	160.00

USED 4-CYLINDER MOTORS

Van 20-22 H.P. Overhead valves.....	75.00
Ohio 35 H.P., 4x5 heavy duty.....	100.00
Rambler 35 H.P., overhead valves.....	65.00
Cadillac 40 H.P., 4 1/2 x 5 1/4.....	75.00

Get our list on 2-cylinder motors.

TRANSMISSIONS

Brown & Lipe 3-speed, slide control levers	50.00
Covert 3-speed (for 40 H.P. or under)....	75.00
Croton-Keeton, center control, with levers.....	75.00
Krit 1915, center control with multiple disc clutch, pedals and levers.....	75.00

REAR AXLES

Hess, full floating, with hubs, drums, and caps.....	100.00
Weston-Mott, full floating, complete.....	85.00
Weston-Mott, semi-floating, complete.....	45.00

FRONT AXLES

Elmore Weston-Mott, 30" centers, complete.....	14.00
Henderson, 28 1/2" centers, complete.....	18.00
Demot, 1 1/2" solid coaxed type, complete.....	10.00

FRAMES

Croton, 151 1/2" long, 32" wide.....	15.00
Michigan 40—145 1/2" long, 33" wide.....	7.00
One-ton (truck type), 112" long, 36" wide.....	5.00

STEERING GEARS

Barnes (right hand steer), 55" extreme length.....	10.00
Gemmer Model "O," (left hand steer)....	17.50
Speedwell (right hand steer).....	14.00
Krit, cross steer type (left or right)....	9.00

CLUTCHES

Michigan 40—15 1/4" O. S. dia.....	16.00
Marion 50 multiple disc type.....	22.00
Hartford cone type, with joint.....	20.00

BODIES

Wahl 5-pass., \$38.89, upholstered.....	25.00
Marion 5-pass., upholstered.....	10.00
Finault 2-pass., light car, upholstered.....	10.00

Write for prices on upholstered bodies.

WHEELS

32x3 1/2 fitted with Baker demountable rims, per set.....	20.00
34x4 with Firestone fellos, Goodyear Q. D. rims, per set.....	22.00
30x3 with clincher rims for Ford, each.....	1.50
30x3 1/2 with clincher rims for Ford, each.....	2.00

RADIATORS

Plain, to fit Ford cars.....	18.00
V-shaped, to fit Ford cars.....	21.00
Buick Model 10 (give year).....	20.00
Hupmobile 20.....	22.50

FORD SPECIALS

Ford 1916 Cowl dash touring car bodies, with top, slide curtains, hood, windshield, rear fenders, fender irons (new) One-man mohair tops (Jiffy curtains)....	98.00
Rubber slip roof outfits (all parts except bows and sockets) for 1912, 1913, 1914, 1915 touring cars.....	22.50
Speedster outfit complete, including V-shape radiator.....	10.00
Simplex shock absorbers (per set 4)....	65.00
Folding Tire Saver Jacks (per set 4)....	3.85
	1.65

MISCELLANEOUS

Semi-elliptic springs, 47 1/2 x 2 1/4 x 8, each.....	2.00
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Galvanized moulding, per ft.....	.03
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Oswald, 4 cyl., 4 x 4 1/2.....	75.00
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Regal 30, 4 x 4 1/2.....	75.00
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Above are used motors, guaranteed to be in good shape. Will take other motors in on trade.

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Tops.....	12.00 up
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Tire holders.....	.20 up
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Tanks—(oval and round) all sizes.....	4.00 up
Runabout bodies for Ford—absolutely new.....	30.00
Presto Tanks.....	9.00
Touring bodies.....	25.00 up
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Hupmobile 20.....	21.25
Oakland 1911.....	28.50
Overland 59-69-T-40-32.....	29.00
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Buick 10.....	20.00
Hudson 20, 32 and 33.....	28.50
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Colby, Models 40 and 50.....	30.00
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TIRES

BEAR-VULCO DOUBLE TREAD

Run 5,000 miles. Sometimes twice as far. By our special process we rejuvenate old tires, making 2 used tires into one new guaranteed BEAR-VULCO Double Tread Tire. For years our process has been successfully used in Europe, where economy starts. BEAR-VULCO Tires give concentrated benefit of 2 tires in one. After once using them you will never be satisfied to pay high prices again. You will never need to.

SIZE	If you furnish casings	If you furnish one casing	SIZE	If you furnish casings	If you furnish one casing
28x3.....	\$1.75	\$3.75	35x4.....	\$3.25	\$7.00
30x3.....	2.00	4.00	36x4.....	3.25	7.25
30x3½.....	2.50	5.00	34x4½.....	3.50	7.50
31x3½.....	2.50	5.25	35x4½.....	3.50	7.75
32x3½.....	2.50	5.50	36x4½.....	3.75	8.00
34x3½.....	2.75	5.75	37x4½.....	3.75	8.25
31x4.....	3.00	6.00	35x5.....	4.00	8.50
32x4.....	3.00	6.25	36x5.....	4.00	9.00
33x4.....	3.00	6.50	37x5.....	4.00	9.50
34x4.....	3.00	6.75	37x5½.....	4.00	10.00

The small charge of 35 cents is made when a tire requires an inner shoe.

Start using BEAR-VULCO Double Tread Tires today. Let us send you one—guaranteed—with privilege of examination before paying. We carry a large stock of BEAR-VULCO Tires at all times, and sell them at low prices, express prepaid. Send us two of your old tires today.

BEAR TIRE CO.

1229 S. Wabash Ave. Chicago, Ill.

SEND TWO OLD TIRES

TO COWANS BROTHERS

WE ARE THE ORIGINATORS
OF THE
RECLAIMED SYSTEM

We are making a business of reclaiming old tires. In other words, we make one sound tire out of two old ones. We can save you money. Drop up a postal today. Full prices sent on request.

COWANS BROTHERS

150 W. 55th St. New York Philadelphia Branch: 815 N. Broad St.

A GREAT TIRE AND TUBE SALE
100 makes, 15,000 tubes and shoes. New and A1 stock. At ridiculously low prices. Saving from 40% to 70%. Cheapest house in the city.

JANDORF AUTOMOBILE CO.
1764 Broadway New York City

CHAMPION DOUBLE-TREAD TIRES

Good for 4,000 to 5,000 Miles

We take two old tires, one which is road-worn and another which is rim-cut, vulcanize them together and then sew the side walls. The sewing is done with a patented lock stitch, the only one of its kind on the market. It can't pull loose or injure the sidewalls.

These tires are giving perfect satisfaction to thousands of users today. A trial order will convince you. Send it in now.

Oil-Proof—Weather-Proof—Puncture-Proof
OUR OFFER

Don't send any money. Just send two old casings, which we will build into our Genuine Champion Double Tread Tire, or send one casing, we can furnish the other.

We reserve the right to reject any work because of condition

SIZE	If You Furnish Both Casings	If We Furnish One Casing	SIZE	If You Furnish Both Casings	If We Furnish One Casing
30x3.....	\$2.75	\$4.00	36x4.....	\$4.50	\$6.50
32x3.....	2.75	4.00	38x4.....	4.75	6.75
30x3½.....	3.00	4.50	34x4½.....	4.50	6.50
31x3½.....	3.00	4.50	35x4½.....	4.75	7.25
32x3½.....	3.00	4.50	36x4½.....	4.75	7.25
34x3½.....	3.25	4.75	37x4½.....	5.00	7.50
36x3½.....	3.50	5.00	38x4½.....	5.25	8.00
30x4.....	3.50	5.00	40x4½.....	5.50	8.75
31x4.....	3.75	5.25	42x4½.....	5.50	10.00
32x4.....	3.75	5.25	35x5.....	5.00	7.50
33x4.....	4.00	5.50	36x5.....	5.50	8.50
34x4.....	4.25	6.00	37x5.....	5.50	9.00
35x4.....	4.25	6.00			

Small additional charges for necessary repairing
Champion Double Tread Tires carried in stock. Guaranteed 3,000 miles. Write today for new price list.

Send in the old tires today

CHAMPION DOUBLE TREAD TIRE CO.
1710-18 Grand Kansas City, Mo.

SAVE MONEY

Send us your discarded Tires. We make them over at a cost that is about half the rate you pay using new tires.

WILCOX BROS.

3019 Michigan Ave. Chicago

TIRES

WE SELL

Akron Tires

Everybody knows what AKRON TIRES are—they have used them for years. No argument necessary.

Largest Stock; Lowest Prices

Size	Plain	Tubes	Size	Plain	Tubes
28x3.....	\$5.00	\$1.80	34x4.....	\$9.00	\$3.20
30x3.....	5.00	1.90	35x4.....	10.00	3.30
30x3½.....	6.50	2.15	36x4.....	10.00	3.35
32x3½.....	7.50	2.25	31x4½.....	12.00	4.00
34x3½.....	8.00	2.35	35x4½.....	12.50	4.10
31x4.....	8.75	2.95	36x4½.....	13.50	4.15
32x4.....	8.50	3.05	37x4½.....	14.00	4.25
33x4.....	9.00	3.10	36x5.....	15.00	4.95
			37x5.....	16.00	5.05

Non-Skids \$1.00 Extra; All Sizes

EXPRESS CHARGES PREPAID
only when money accompanies order in full.

10% required on C. O. D. orders

AKRON TIRE CO., Inc.

Authorized Capital, \$300,000.00

1789 Broadway, Corner of 58th St.
NEW YORK

The Clearing House—continued.

ANNUAL TIRE SALE

In Guaranteed and Used Tires			
Size	Used	Size	Used
30x3.....	\$4.50	34x4.....	\$ 9.00
30x3 1/2.....	6.00	34x4 1/2.....	10.00
32x3 1/2.....	7.00	36x4 1/2.....	11.00
33x4.....	8.00	37x5.....	12.00

10% deposit with order, balance C. O. D. subject to examination

ACME TIRE AND REPAIR CO.
1547 Michigan Ave. Chicago, Ill.

SAVE MONEY

on your next

TIRE BILL

by using our

DOUBLE TREAD TIRES

Size	Plain	Size	Plain
30x3.....	\$4.00	34x4.....	\$ 8.00
30x3 1/2.....	5.00	36x4.....	8.00
32x3 1/2.....	6.00	34x4 1/2.....	9.00
34x3 1/2.....	7.00	35x4 1/2.....	9.00
32x4.....	7.00	36x5.....	11.00
33x4.....	7.00	37x5.....	11.00

NON-SKIDS \$1.00 EXTRA

For retreading your old tires we charge you 40% off above prices. Make sure when ordering tires to state whether Q. D. straight bead or clincher type.

Terms: C. O. D., 10% Deposit Required

I. JAFFESS

Main Store

1319C Fifth Ave.
282C Halsey St.

New York
Newark, N. J.

SLIGHTLY USED AND DEMONSTRATING TIRES

ABSOLUTELY GUARANTEED

We are the only firm that will guarantee slightly used or demonstrating tires and make adjustments wherever it is necessary.

Those who have bought tires from us are convinced of the above statement. Those who have not can easily convince themselves by sending us an order.

We also carry a full line of brand new tires at greatly reduced prices.

Following are the prices of our slightly used and demonstrating tires, which are all guaranteed:

Size	Price	Size	Price	Size	Price
30x3.....	\$3.00	35x4.....	\$6.50	36x4.....	\$6.75
30x3 1/2.....	3.75	33x4.....	6.25	35x5.....	7.50
30x4.....	4.25	34x4 1/2.....	7.00	36x4 1/2.....	7.25
32x3 1/2.....	4.50	36x3 1/2.....	6.75	37x4 1/2.....	8.25
31x4.....	4.25	34x4.....	6.75	36x5.....	8.25
32x4.....	6.00	32x4 1/2.....	6.00	37x5.....	8.50

Take advantage of our wonderful prices on positively BRAND NEW TIRES (Straight Side Only). Only limited stock at this price:

32x3 1/2.....	\$7.10	35x4.....	\$8.80
34x3 1/2.....	8.00	36x4.....	9.00
34x4.....	8.20		

We require \$1.00 deposit on all mail orders to defray express charges. All shipments made promptly subject to inspection.

AUTO SALES AND PARTS

1429 S. State Street, Chicago

WELDING

AAA WHY WELD???

When you can do better work in one-fourth the time—at one-fourth the price, by using the latest great discovery

SO-LUMINUM The Aluminum Solder

No welding. No oxidation. No flux necessary. Runs at low temperature. Easily applied with gasoline torch. Twice as strong and much harder than aluminum—never breaks at soldered point. Convince Yourself by Trying It. Used by International Motor, Locomobile, Packard, Stanley, Pierce-Arrow, Brewster, Demarest, Studebaker, Simplex, Sperry Gyroscope Co., Aeroplane Mfgs., and U. S. Navy. Write for booklet 44. \$3.50 per lb. sample stick (1/4 pound) \$1.50 net cash.

So-Luminum Mfg. & Eng. Co., Inc.

Sole Manufacturers and Distributors
United States Rubber Co. Bldg.
1790 Broadway, New York

Absolutely Guaranteed Welding

We absolutely guarantee all work done by the OXWELD PROCESS of welding and cutting, including welding cracked or defective cylinders, crankshafts, housing aluminum crank and transmission cases, etc., etc. Estimates furnished on job and contract welding and cutting of all kinds.

OXWELD ACETYLENE COMPANY
36th St. and Jasper Pl., Chicago, Ill.

Oxy-Acetylene Welding Automobile and Machinery Parts

WELDED AND MACHINED
Cracked Cylinders a Specialty

ADAPT MACHINERY CO.
1624 Wabash Ave. Chicago, Ill.

WE DO WELDING

others cannot do on parts of aluminum or cast iron. Expert auto repairmen dismantle and reassemble jobs. Ship your worst smashed crank-cases and cylinders to
HOBBIE'S WELDING PLANT, Hampton, Iowa

WELDING

Prompt Service—Prices Reasonable—Work Guaranteed. Automobile Stamping and Sheet Metal Work. Special Welding Compounds for Sale. WM. GREEN MFG. & WELDING CO., Harvey, Ill.

If you have Motor Car Parts or an Accessory and haven't time to prepare an advertisement, we will do it for you—no charge.
Address your letter to
Dept. C. H.

MOTOR AGE
Chicago



There is a big field for PERFECTION RINGS and energetic dealers will find them highly profitable to sell. Write for our prices and discounts.

A. H. COATES, 442 Market St., San Francisco, Cal., Western Representative for North and South; West of Denver.

SOLE DISTRIBUTORS

Automobile Construction & Engineering Company
3328 Ludlow Street, Philadelphia, Pa.

SUB-DISTRIBUTORS

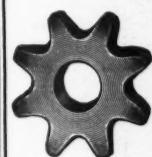
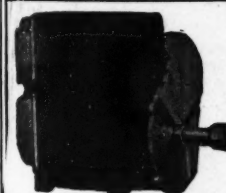
N. A. PETRY CO., Inc., 1309 Race St., Philadelphia, Agents for Penna. and Atlantic Coast States, South.

FOR FORD CARS

FISHER ELECTRIC LIGHTING and STARTING SYSTEM

Motor and generator combined in one compact, self-contained unit, although acting independent of one another. 12-volt, 3-wire system, 6-volt lamps. Noiseless. Attached without machine work. Write.

Fisher Electrical Works, Detroit, Mich.



SPROCKETS

CHAINS AND DIFFERENTIAL

IN STOCK OR ORDER

SEND FOR NEW CATALOG

Cullman Wheel Co. 1341 Altgeld St. Chicago



The Simplex (Short-Turn) Automobile Trailer

Quickly attached to any automobile. Light, durable. Trails in the track of the automobile. Will not skid. A modern necessity at a nominal price. Write for liberal discount prices.
THE SIMPLEX SHORT-TURN GEAR CO.
Dept. G, Anderson, Ind.



Single Unit
Electric
Starting
and
Lighting
System

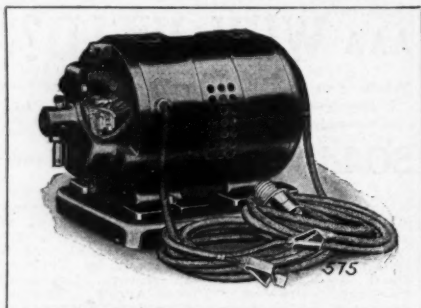


Famous for Power and Non-Stalling Efficiency. Catalog on Request.

DYNETO ELECTRIC CO., Syracuse, N. Y.

Send Us Your Electrical Problems

Robbins & Myers Battery Charging Sets



These motor-generator battery charging sets are made in sizes suitable for public or private garages. The larger sets will charge several batteries at a time.

They connect to any lamp socket and require no attention. All that is necessary is to screw the motor lead in a lamp socket and attach the generator terminals to the battery. When the battery is fully charged, the outfit will float on the line without injury to the battery.

Garages can make excellent profits by installing one of these sets for charging batteries for customers.

Jobbers and Dealers will find these outfits easy, profitable sellers. Write for prices and discounts.

Prices, \$42.00 and Up

THE ROBBINS & MYERS CO.

SPRINGFIELD, O.

New York Boston Philadelphia Rochester Cleveland
Cincinnati Chicago St. Louis San Francisco



Today Is a Day of Specialties

Our Specialty is Making Rubberized Trimmings for Automobile Tops, Curtains and Upholstery

**The Best Quality That Can Be
Produced for This Purpose Is**

BULL DOG QUALITY

Any old trimming is good enough for any old car, but BULL DOG QUALITY is a luxurious attraction to the best cars built—when you really want quality that looks better and possesses almost unlimited wear, there is just one thing to do, and that is

Use Bull Dog Quality

We are the sole manufacturers of Numotor Fabrics

SHALL WE SEND YOU
SAMPLES AND PRICES?

L. J. MUTTY CO., BOSTON, MASS.

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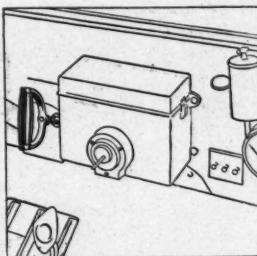
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Operated from the Driver's Seat. Note Handle Control.

Majestic (Mechanical) Under-the-Hood Starter For Ford Cars

From the driver's seat, operated with one hand, the MAJESTIC Mechanical Starter spins the motor of your Ford. Just pull the handle, and push it back. Simplest starting device in operation. Free from complication, like your Ford. Works every time.

Fully Guaranteed

Attaches without adjustments. Crank stays in place. Absolutely backfire-proof. No load on the motor. No delicate electrical connections to work loose. No running expense or upkeep. Attach it yourself, in 1½ hours. First cost only cost—\$9.75. Don't pay more.

BIG SALES
LIBERAL PROFITS
FOR DEALERS

\$9.75

Majestic Mfg. &
Specialty Co.
1355 S. Mich. Av.
Chicago



Attached Without Adjustment



OLD SOL Electric Spotlights

HANDSOME—POWERFUL—INDISPENSABLE

attached to windshield, turn at any angle, enabling the motorist to see on all sides by a turn of the wrist. Quickly and easily operated by switch on handle.

Quick sales are further stimulated by the use of an Old Sol Spotlight Silent Salesman—a handsome illustrated colored display stand given ABSOLUTELY FREE to Old Sol Dealers. Write for our attractive dealer proposition and 1915 Catalog.

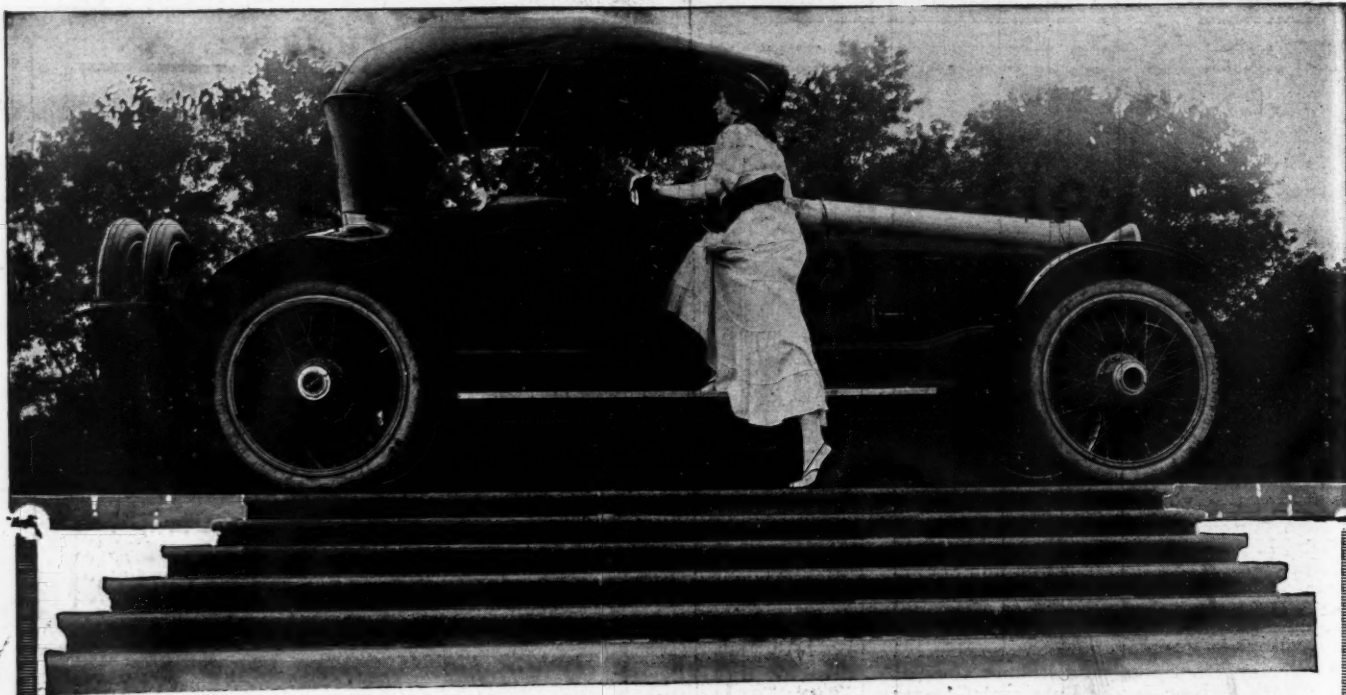
Old Sol No. 70 (here illustrated) Price \$6.50
 No. 75 Model, Price \$3.50, is smaller and admirably adapted for use on Ford and other light cars. Either can be quickly detached and used as a trouble light.

Pacific Coast Representatives—Bailey-Drake Co.,
604 Mission St., San Francisco, Cal.

HAWTHORNE MANUFACTURING COMPANY, Inc.
Manufacturers of Old Sol Lighting Systems
for Automobile, Motorcycle, Motorboat, Carriage,
Bicycle and Hand Use.

30 SPRUCE STREET

BRIDGEPORT, CONN.



Nothing gets a prospective buyer to fix his interest on your cars quicker than

HOUK "QUICK CHANGE" **WIRE WHEELS**

Nothing improves a car's general appearance so much—nothing gives it the all steel capable—flexible—easy riding—light, speedy appearance these wheels impart. Nothing distinguishes a car from the ordinary, quite as quickly, and as substantially.

Besides the attention and interest—Houk Quick Change Wire Wheels focus on a car so equipped—they possess so many and so vital advantages that you have at your command a wealth of selling points—strong and convincing enough to decide many a man's mind that otherwise was far from being made up.

Houk Quick Change Wire Wheels
help you sell cars

Many manufacturers of their volition, or because their dealers demand it, are making Houk Quick Change Wire Wheels Standard equipment—furnishing them at no extra cost.

Still more progressive and still better from your standpoint is the policy of the manufacturer who makes them exclusive equipment.

Houk Manufacturing Company

BUFFALO, NEW YORK

**New York,
1792 Broadway**

**San Francisco,
Hewes Bldg.**

**Chicago,
2337 Michigan Ave.**



Announcing Campbell Detachable Upholstery

(The First of a Series of Full Page Advertisements in
The Saturday Evening Post, Literary Digest, etc.)

WHAT a Paris frock does for a woman, Campbell Detachable Upholstery does for a motor car—**classes** it.

Over the shabby upholstery of last year's car, or the shining newness of this year's, it works a genuine transformation. At a stroke, it gives the interior trim a luxurious look, a soft warmth and **tone**, found only in the finest limousines.

There is a set specially designed for practically every model of every car. It fits over the regular upholstery, like the upholstery itself, becoming in appearance an inherent part of the car body. Any one can install it—no alterations are necessary. With a snap of its fasteners you adjust each hand-tailored part over seats, backs, arms and doors. With equal ease you slip it off for cleaning.

There is the same satisfaction in owning a car equipped with Campbell Detachable Upholstery that there is in being faultlessly dressed. There is an added comfort, and a very practical satisfaction, in the always cool, always clean seats. If you are buying a new car, ask to see it equipped in this latest style. If you want to make an old car look like new again, order its particular set of Campbell Detachable Upholstery from your dealer—today.

Dealers: Write for folder of fabric samples and discounts

Campbell Detachable Upholstery is made in a variety of smart motor fabrics and linens, to harmonize with cars of every color. Send for folder showing actual samples, and price list, with special discounts to the trade. Address The Perkins-Campbell Co., 624 Broadway, Cincinnati, Ohio. New York Office, 89 Chambers St.



The name Campbell
on the fasteners is
the quality mark of
genuine Campbell
Detachable Uphol-
stery.



Justifiable Pride

No Wonder This Model Has Outsold Any Car of Its Size Ever Designed

EVERY single feature which one would expect to find in a thoroughly high-grade car is embodied in this Overland.

No comfort is lacking—no convenience is unprovided.

It has even that ultra-convenience of the very high priced cars—electrical switches located on the steering column.

Warning signal, magneto switch, dash-light, tail-light, head-light and dimming switches are all right at your hand—arranged so that you cannot miss or confuse them.

It also has that certainty of ignition provided only by high-tension magneto.

It has the comfortable, easy riding qualities provided by wide, roomy seats with soft yielding upholstery built over long spiral springs.

It has long underslung rear springs and large four-inch tires to add further to its easy riding qualities.

It has the same easy acting clutch and the same thirty-five horsepower motor which made previous Overlands famous.

But as this is a lighter car there is even more reserve power.

There is roomy comfort for its full quota of five adult passengers.

The lines of its streamline body are pleasing from every angle.

It has a beautiful, lustrous finish.

In its performance—its convenience—its comfort—its roominess—its beauty, you will take justifiable pride.

And the price is only \$750.

This is the car which has outsold anything of its size ever designed.



"Made
in
U. S. A."

The Willys-Overland Company, Toledo, Ohio

Also Manufacturers of Willys-Knight Automobiles